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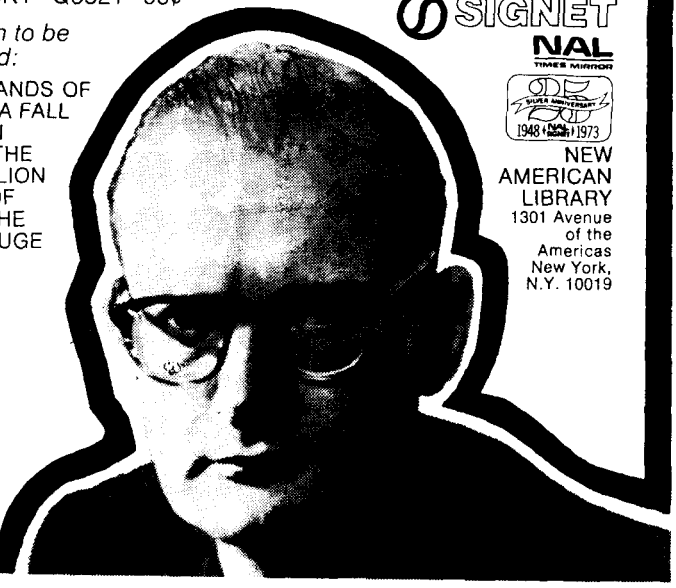

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RENDEZVOUS WITH RAMA

ARTHUR C. CLARKE

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A world turned inside out came hurtling through space. Did it mean the end of man—or another beginning?

It was bound to happen sooner or later. On June 30, 1908, Moscow had escaped destruction by three hours and four thousand kilometers—a margin invisibly small by the standards of the universe. On February 12, 1947, a city in Siberia had a still narrower escape when the second great meteorite of the twentieth century detonated less than four hundred kilometers from Vladivostok, the explosion rivaling the force of the newly invented uranium bomb.

In those days men could do nothing to protect themselves against the last random shots in the cosmic bombardment that had once scarred the face of the moon. The meteorites of 1908 and 1947 had struck uninhabited wilderness, but by the end of the twenty-first century, there was no region left on Earth that could be safely used for celestial tar-

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get practice. The human race had spread from pole to pole. And so, inevitably . . .

I

AT 09.46 G.M.T. on the morning of September 2, in the exceptionally beautiful summer of the year 2077, most of the inhabitants of Europe saw a dazzling fireball appear in the eastern sky. Within seconds it was brighter than the sun and as it moved across the heavens—at first in utter silence—it left behind it a churning column of dust and smoke.

Somewhere above Austria it began to disintegrate, producing a series of concussions so violent that more than a million people had their hearing permanently damaged. They were the lucky ones.

Moving at fifty kilometers a second, a thousand tons of rock and metal impacted on the plains of northern Italy, destroying in a few flaming moments the labor of centuries. The cities of Padua and Verona were wiped from the face of the earth and the last glories of Venice sank forever beneath the sea as the waters of the Adriatic came thundering landward after the hammer blow from space.

Six hundred thousand people died and the total damage was more than a trillion dollars. But the loss to art, to history, to science—to the whole human race, for the rest of time—was beyond all computation. If was as if a great war had been fought and lost in a single morning—and few could draw much pleasure from the fact that, as the dust of destruction slowly settled, for months the whole world witnessed the most splendid dawns and sunsets since Krakatoa.

After the initial shock, mankind reacted with a determination and a unity that no earlier age could have shown. Such a disaster, it was realized, might not occur again for a thousand years—but it might occur tomorrow. And the next time the consequences would be even worse.

There could be no next time . . .

A hundred years earlier a much poorer world, with far feebler resources, had squandered its wealth attempting to destroy weapons launched suicidally by mankind against itself. The effort had never been successful, but the skills acquired then had not been forgotten. Now they could be used for a far nobler purpose and on an infinitely vaster stage. No meteorite large enough to cause catastrophe would ever again be allowed to breach the defenses of Earth.

So began Project SPACEGUARD. Fifty years later—and in a way that none of its designers could ever have anticipated—it justified its existence.

BY THE year 2130 the Mars-based radars were discovering new asteroids at the rate of a dozen a day. The SPACEGUARD computers automatically calculated their orbits and stored away the information in their enormous memories, so that every few months any interested astrono-

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mer could have a look at the accumulated statistics. These were now quite impressive.

It had taken more than a hundred and twenty years to collect the first thousand asteroids, following the discovery of Ceres, largest of these tiny worlds, on the very first day of the nineteenth century. Hundreds had been found and lost and found again—they existed in such swarms that one exasperated astronomer had christened them "vermin of the skies." Only the five giants—Ceres, Pallas, Juno, Eunomia and Vesta—were more than two hundred kilometers in diameter. The vast majority were merely oversized boulders that would fit into a small park. Almost all moved in orbits that lay beyond Mars—only the few that came far enough sunward to be a possible danger to Earth were the concern of SPACEGUARD. And not one in a thousand of these, during the entire future history of the solar system, would pass within a million kilometers of Earth.

The object first catalogued as 31/439, according to the year and the order of its discovery, was detected while still outside the orbit of Jupiter. Nothing about its location was unusual—many asteroids went beyond Saturn before turning once more toward their distant master, the sun. And Thule II, most far-ranging of all, traveled so close to Uranus that it might well be a lost moon of that planet.

But a first radar contact at such a distance was unprecedented—clearly, 31/439 must be of exceptional size. From the strength of the echo the computers deduced a diameter of at least forty kilometers. Such a giant had not been discovered for a hundred years. That it had been overlooked for so long seemed incredible.

Then the orbit was calculated and the mystery was resolved—to be replaced by a greater one. 31/439 was not traveling on a normal asteroidal path, along an ellipse which it retraced with clockwork precision every few years. It was a lonely wanderer among the stars, making its first and last visit to the solar system—for it was moving so swiftly that the gravitational field of the sun could never capture it. It would flash inward past the orbits of Jupiter, Mars, Earth, Venus and Mercury, gaining speed as it did so, until it rounded the sun and hurtled into the unknown.

It was at this point that the computers started flashing their *Hi, there! We have something interesting* . . . sign and for the first time 31/439 came to the attention of human beings. There was a brief flurry of excitement at SPACEGUARD headquarters and the interstellar vagabond was quickly dignified by a name instead of a mere number. The astronomers had long ago exhausted Greek and Roman mythology—now they were working through the Hindu pantheon. And so 31/439 was christened *Rama*.

FOR a few days the news media made a fuss about the visitor, but they were badly handicapped

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by the sparsity of information. Only two facts were known about *Rama*—its unusual orbit and its approximate size. Even this was merely an educated guess, based upon the strength of the radar echo. Through the telescope *Rama* still appeared as a faint, fifteenth-magnitude star—much too small to show as a disk. But as it plunged toward the heart of the solar system it would grow brighter and larger month by month. Before it vanished forever the orbiting observatories would be able to gather more precise information about its shape and size. There was plenty of time—and perhaps during the next few years some spaceship on its ordinary business might be routed close enough to get good photographs. An actual rendezvous was most unlikely. The energy cost would be far too great to permit physical contact with an object cutting across the orbits of the planets at more than a hundred thousand kilometers an hour.

So the world soon forgot about *Rama*, but the astronomers did not. Their excitement grew with the passing months as the new asteroid presented them with more and more puzzles.

Most absorbing of these was the problem of *Rama's* light curve. It didn't have one.

All known asteroids, without exception, show a slow variation in their brilliance, waxing and waning with a period of a few hours. It had been recognized for more than two centuries that this phenomenon was an inevitable result of their spin and their irregular shape. As they toppled end over end along their orbits, the reflecting surfaces they presented to the sun were continually changing and their brightness varied accordingly.

Rama showed no such changes. Either it was not spinning at all or it was perfectly symmetrical. Both explanations seemed equally unlikely.

There the matter rested for several months, because none of the big orbiting telescopes could be spared from their regular job of peering into the remote depths of the universe. Space astronomy was an expensive hobby and time on a large instrument could easily cost a thousand dollars a minute. Dr. William Stenton would never have been able to grab the Farside two-hundred-meter reflector for a full quarter of an hour if a more important program had not been temporarily derailed by the failure of a fifty-cent capacitor. One astronomer's bad luck was his good fortune.

Bill Stenton did not know what he had caught until the next day, when he was able to get computer time to process his results. Even when they were finally flashed on his display screen it took him several minutes to understand what they meant.

The sunlight reflected from *Rama* was not, after all, absolutely constant in its intensity. There was a very small variation—hard to detect, but quite unmistakable and extremely regular. Like all the other asteroids, *Rama* was indeed spinning. But where-

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as the normal "day" for an asteroid was several hours, *Rama's* was only four minutes.

Dr. Stenton did some quick calculations and found it hard to believe the results. At its equator this tiny world must be spinning at more than a thousand kilometers an hour—it would be rather unhealthy to attempt a landing anywhere except at the poles. The centrifugal force at *Rama's* equator must be powerful enough to flick any loose objects away from it at an acceleration of almost one gravity. *Rama* was a rolling stone that could never have gathered any cosmic moss. It was surprising that such a body had managed to hold itself together and had not long ago shattered into a million fragments.

An object forty kilometers across and with a rotation period of only four minutes—where did that fit into the astronomical scheme of things? Dr. Stenton was a somewhat imaginative man, a little too prone to jump to conclusions. He now jumped to one that gave him a very uncomfortable few moments indeed.

The only specimen of the celestial zoo that fitted this description was a collapsed star. Perhaps *Rama* was a dead sun—a madly spinning sphere of neutronium, every cubic centimeter weighing billions of tons.

Just then there flashed briefly through Dr. Stenton's horrified mind the memory of that timeless classic, H.G. Wells' *The Star*. He had first read it as a boy and it had helped to spark his interest in astronomy. Across more than two centuries of time it had lost none of its magic and its terror. He would never forget the images of hurricanes and tidal waves, of cities sliding into the sea, as that other visitor from the stars smashed into Jupiter and then fell sunward past the Earth. True, the star that old Wells described was not cold, but incandescent—it had wrought much of its destruction by heat. The point scarcely mattered. Even as a cold body, reflecting only the light of the sun, *Rama* could kill by gravity as easily as by fire.

Any stellar mass intruding into the solar system would completely distort the orbits of the planets. The Earth had only to move a few million kilometers sunward—or starward—for the delicate balance of climate to be destroyed. The Antarctic icecap could melt and flood all low-lying land or the oceans could freeze and the whole world be locked in an eternal winter. Just a nudge in either direction would be enough.

Then Dr. Stenton relaxed and breathed a sigh of relief. This was all nonsense—he should be ashamed of himself.

Rama could not possibly be made of condensed matter. No star-sized mass could penetrate so deeply into the solar system without producing disturbances that would have betrayed it long ago. The orbits of all the planets would have been affected—that, after all, was how Neptune, Pluto and Persephone had been discovered. No, it was utterly impossible for an object as massive as a dead sun to sneak up unobserved.

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In a way it was a pity. An encounter with a dark star would have been quite exciting.

While it lasted.

THE extraordinary meeting of the Space Advisory Council was brief and stormy. Even in the twenty-second century no way had yet been discovered of keeping elderly and conservative scientists from occupying crucial administrative positions. Indeed, it was doubted that the problem ever would be solved.

To make matters worse, the current chairman of the SAC was Professor (Emeritus) Olaf Davidson, the distinguished astrophysicist. Professor Davidson was not very much interested in objects smaller than galaxies and never bothered to conceal his prejudices. And though he had to admit that ninety percent of his science was now based on observations from space-borne instruments, he was not at all happy about it. No less than three times during his distinguished career, the satellites specially launched to prove one of his pet theories had done precisely the opposite.

The question before the council was straightforward enough. There was no doubt that *Rama* was an unusual object—but was it an important one? In a few months it would be gone forever and suddenly there was little time in which to act. Opportunities missed now would never recur.

At a rather horrifying cost a space probe soon to be launched from Mars to travel beyond Neptune could be modified and sent on a high-speed trajectory to meet *Rama*. There was no hope of a rendezvous—and it would be the fastest fly-by on record. The two bodies would pass each other at two hundred thousand kilometers an hour. *Rama* would be observed intensively for only a few minutes—and in real close-up for less than a second. But with the right instrumentation that would be long enough to settle many questions.

Although Professor Davidson took a very jaundiced view of the Neptune probe, it had already been approved and he saw no point in sending more good money after bad. He spoke eloquently on the follies of asteroid-chasing and the urgent need for a new high-resolution interferometer on the moon to prove the newly revived Big Bang theory of creation once and for all.

That was a grave tactical error, because the three most ardent supporters of the Modified Steady State Theory were also members of the council. They secretly agreed with Professor Davidson that asteroid-chasing was a waste of money—nevertheless . . .

He lost by one vote.

THREE months later the space probe, rechristened *Sita*, was launched from Phobos, the inner moon of Mars. The flight time was seven weeks and the instrument was switched to full power only five minutes before interception. A cluster of camera pods was released simultaneously to sail past *Rama*, so that it could be pho-

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tographed from all sides.

The first images, from ten thousand kilometers away, brought to a halt the activities of all mankind. On a billion television screens appeared a tiny, featureless cylinder, growing rapidly second by second. By the time it had doubled its size no one could pretend any longer that *Rama* was a natural object.

Its body was a cylinder so geometrically perfect that it might have been turned on a lathe—one with centers fifty kilometers apart. The two ends were quite flat, apart from some small structures at the center of one face, and were twenty kilometers across. From a distance, when there was no sense of scale, *Rama* looked almost comically like an ordinary domestic boiler.

Rama grew until it filled the screen. Its surface was a dull, drab gray, as colorless as the moon and completely devoid of markings except at one point. Halfway along the cylinder was a kilometer-wide stain or smear, as if something had once hit and splattered there ages ago.

No sign could be detected that the impact had done the slightest damage to *Rama's* spinning walls, but this mark had produced the slight fluctuation in brightness that had led to Stenton's discovery.

The images from the other cameras added nothing new. However, the trajectories their pods traced through *Rama's* minute gravitational field gave one other vital piece of information—the mass of the cylinder.

Ballantine Books

The biggest and best news of the month—although the actual event took place a while back—is that Judy-Lynn del Rey has joined the Ballantines. Welcome to the duckpress, Judy.

The second big news is the acquisition by Ballantine (for staggering sums of lovely money) of Arthur Clarke's new works. This is welcome home for Arthur, one of the very first greats we ever published (#33 where are you? Still in print—you know it as CHILDHOOD'S END).

●●●

So. August's publications include a broth of fresh air titled COOKING OUT OF THIS WORLD, edited (rather desperately, we suspect) by Anne McCaffrey. As a seasoned s.f. writer even she could not have anticipated some of the recipes her writing fraternity would come up with. But it's fun, and there are even some good recipes. So plunge in—there is much to be learned about your favorite authors. Anne herself contributes TO RIDE PEGASUS, that wildly talented lot; and Isidore Haiblum has a mind-boggling TRANSFER TO YESTERDAY.

The adult fantasy is a first—by Anne Sanders Laubenthal who, in-

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credibly, makes it probable, even likable, that Excalibur should turn up in Mobile, Alabama. (Honest to God.) We couldn't believe it ourselves when she told us—but the book is very convincing. Besides being splendid adventure.

●●●

September—all you Deryni fans will be grateful to learn that Katherine Kurtz has at last written Volume III, HIGH DERYNI—but you have not seen the end yet. A fourth, and even a fifth, are planned. Adult fantasy does not seem to like the confines of one volume.

Larry Niven has a brand new, long, complex, wonderful novel called PROTECTOR—no point in trying to describe, you must experience for yourselves—and a marvelous group of shorts, the Svetz stories, titled THE FLIGHT OF THE HORSE.

And, finally, pick up a book by a stranger (?) calling himself John Holbrook Vance. The title is BAD RONALD. A smash. Or, as the mainstream would have it, a tour de force. This department cannot subscribe to the theory of the author that Ronald is a perfectly normal boy who went a little wrong.

Anyway, buy it. Buy, buy, buy them all. Now that we're big and important we've got to sell a lot of books.

See you for fun and games at Torcon.

BB

It was far too light to be a solid body. To nobody's great surprise, it was clear that *Rama* must be hollow.

The long-hoped, long-feared encounter had come at last. Mankind was about to receive its first visitor from the stars.

II

COMMANDER NORTON remembered the TV transmissions he had replayed so many times during the final minutes of the rendezvous. But there was one thing no electronic image could possibly convey—and that was *Rama's* overwhelming size.

He had never received a similar impression when landing on a natural body. The moon and Mars were worlds, of course, and one expected them to be big. But he had also landed on Jupiter VIII, which was slightly larger than *Rama*—and that had seemed quite a small object.

To resolve the paradox was easy. His judgment was wholly altered by the fact that this was an artifact millions of times heavier than anything that man had ever put into space. The mass of *Rama* was at least ten million million tons—to any spaceman, that was not only an awe-inspiring but a terrifying thought. Norton knew a sense of insignificance, even depression, as that cylinder of sculptured and ageless metal filled more and more of the sky.

There was also a sense of danger here that was wholly novel to his experience. In every earlier landing he had known what to ex-

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pect—there was always the possibility of accident, but never of surprise. With *Rama* surprise was the only certainty.

Now *Endeavor* was hovering less than a thousand meters above the north pole of the cylinder, at the very center of the slowly turning disk. This end had been chosen because it was the one in sunlight. The shadows of the short, enigmatic structures near the axis swept steadily across the metal plain as *Rama* rotated. The northern face of *Rama* was a gigantic sundial, measuring out the swift passage of its four-minute day.

Landing a five-thousand-ton spaceship at the center of a spinning disk was the least of Commander Norton's worries. The feat was no different from docking at the axis of a large space station. *Endeavor's* lateral jets had already given her a matching spin and he could trust Lieutenant Joe Calvert to put her down as gently as a snowflake—with or without the aid of the computer.

"In three minutes," said Joe, without taking his eyes from the display, "we'll know if it's made of anti-matter."

Norton grinned as he recalled some of the more hair-raising theories about *Rama's* origin. If the unlikely speculation Joe had referred to proved accurate, the next seconds would witness the biggest bang since the solar system was formed. The total annihilation of ten thousand tons would, briefly, provide the planets with the light of a second sun.

Yet the mission profile had allowed for even this remote contingency and *Endeavor* had squirted *Rama* with one of her jets from a safe thousand kilometers away. Nothing whatsoever had happened when the expanding cloud of vapor had arrived on target; any matter/anti-matter reaction involving even a few milligrams would have produced an awesome fireworks display.

Norton, like all space commanders, was a cautious man. He had looked long and hard at the northern face of *Rama* before selecting the point of touchdown. After much thought he had decided to avoid the obvious spot—the exact center, the axis itself. A clearly marked circular disk, a hundred meters in diameter, was centered on the pole and Norton had a strong suspicion that this must be the outer seal of an enormous airlock. The creatures who had built this hollow world must have had some way of taking their ships inside. This was the logical place for the main entrance and Norton thought it might be unwise to block the front door with his own vessel.

But this decision generated other problems. If *Endeavor* touched down even a few meters from the axis *Rama's* rapid spin would start her sliding away from the pole. At first the centrifugal force would be very weak, but it would be continuous and inexorable. Commander Norton did not relish the thought of his ship slithering across the polar plain, gaining speed minute by minute until it was slung off into space at a thousand kilometers an hour.

It was possible that *Rama's* mi-

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nute gravitational field—about one thousandth of Earth's—might prevent this from happening. It would hold *Endavor* against the plain with a force of several tons and if the surface proved sufficiently rough the ship might stay near the pole. But Norton had no intention of balancing an unknown frictional force against a quite certain centrifugal one.

Fortunately *Rama's* designers had provided an answer. Equally spaced around the polar axis were three low, pillbox-shaped structures about ten meters in diameter. If *Endeavor* touched down between any two of these the centrifugal drift would fetch her up against them and she would be held firmly in place, like a ship glued against a quay by the waves.

"Contact in fifteen seconds," said Joe. As he tensed himself above the duplicate controls, which he hoped he would not have to touch, Commander Norton became acutely aware of all that had come to focus on this instant of time. This, surely, was the most momentous landing since the first touchdown on the moon a century and a half ago.

The gray pillboxes drifted slowly upward outside the control port. There was the last hiss of a reaction jet and a barely perceptible jar.

In the weeks that had passed Commander Norton had often wondered what he would say at this moment. But now that it was upon him history chose his words and he spoke almost automatically, barely aware of the echo from the past.

"*Rama* Base. *Endeavor* has landed."

AS RECENTLY as a month ago he would never have believed it possible. The ship had been on a routine mission, checking and emplacing asteroid warning beacons, when the order had come. *Endeavor* had been the only spacecraft in the solar system that could possibly make a rendezvous with the intruder before it whipped around the sun and hurled itself back toward the stars. Even so it had been necessary to rob three other ships of the Solar Survey, which were now drifting helplessly until tankers could refuel them. Norton feared that it would be a long time before the skippers of *Calypso, Beagle* and *Challenger* would speak to him again.

Even with all this extra propellant it had been a long, hard chase—*Rama* was already inside the orbit of Venus when *Endeavor* caught up with her. No other ship could have done so—this privilege was unique and not a moment of the weeks ahead was to be wasted. A thousand scientists on Earth would have cheerfully mortgaged their souls for this opportunity—now they could only watch over the TV circuits, biting their lips and thinking how much better they could have done the job. But the inexorable laws of celestial mechanics had decreed that *Endeavor* was the first—and the last—of all man's ships that would ever make contact with *Rama*.

The advice he was continually

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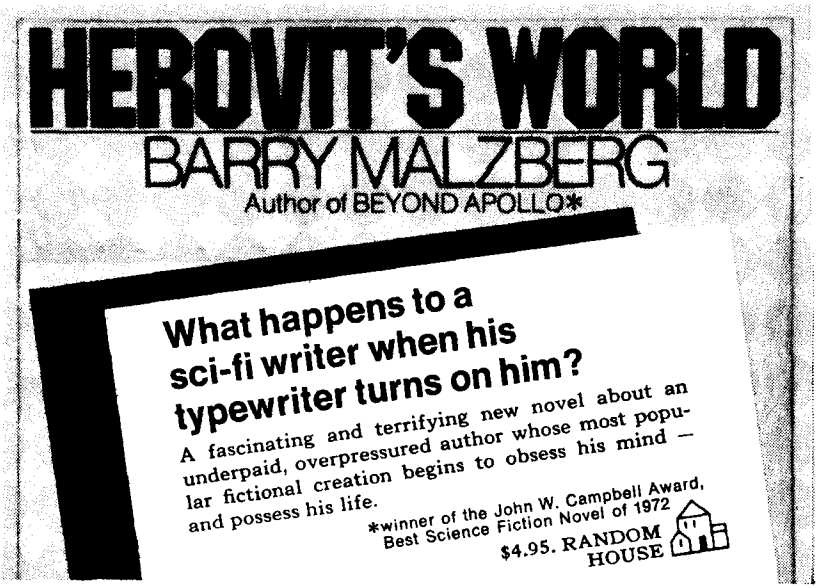
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receiving from Earth did little to alleviate Norton's responsibility. If split-second decisions had to be made no one could help him—the radio time-lag to mission control was already ten minutes and increasing. He often envied the great navigators of the past, before the days of electronic communications, who could interpret their sealed orders without continual monitoring from headquarters. When they made mistakes no one ever knew.

At the same time he was glad that some decisions could be delegated to Earth. Now that *Endeavor's* orbit had coalesced with *Rama's* they were heading sunward like a single body. In forty days they would reach perihelion and pass within twenty million kilometers of the sun. That was far too close for comfort—long before then, *Endeavor* would have to use her remaining fuel to nudge herself into a safer orbit. They would have perhaps three weeks of exploring time before they parted from *Rama* forever.

After that the problem would be Earth's. *Endeavor* would be virtually helpless, speeding on an orbit that could make her the first ship to reach the stars—in approximately fifty thousand years. There was no need to worry, mission control had promised. Somehow, regardless of cost, *Endeavor* would be refueled—even if it proved necessary to send tankers after her and abandon them in space once they had transferred every gram of

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propellant. *Rama* was a prize worth any risk, short of a suicide mission.

And, of course, it might even come to that. Commander Norton had no illusions on this score. For the first time in a hundred years an element of total uncertainty had entered human affairs. Uncertainty was one thing that neither scientists nor politicians could tolerate. If human sacrifice became the price of resolving it—*Endeavor* and her crew would be expendable.

RAMA was silent as a tomb—which, perhaps, it was. *Endeavor* detected no radio signals on any frequency, no vibrations that the seismographs could pick up—apart from micro-tremors undoubtedly caused by the sun's increasing heat—no electrical currents, no radioactivity. *Rama* was almost ominously quiet—one might have expected that even an asteroid would be noisier.

What did I expect? Norton asked himself. *A committee of welcome?*

He was not sure whether to be disappointed or relieved. The initiative, at any rate, appeared up to him.

His orders were to wait for twenty-four hours, then to go out and explore. Nobody slept much that first day—even the crew members not on duty spent their time monitoring the ineffectually probing instruments or simply looking through the observation ports at the starkly geometrical landscape. Was this world alive? Was it dead? Or was it merely sleeping?

On the first EVA, Norton took only one companion—Karl Mercer, his tough and resourceful life-support officer. He had no intention of getting out of sight of the ship and if any trouble arose it was unlikely that a larger party would be safer. As a precaution, however, he had two more crew members suited and standing by in the airlock.

The few grams of weight that *Rama's* combined gravitational and centrifugal fields gave the explorers were neither help nor hindrance—they had to rely entirely on their jets. As soon as possible, Norton told himself, he would string guide ropes between the ship and the pillboxes, so that they could move around without wasting propellants.

The nearest pillbox was only ten meters from the airlock and Norton's first concern was to check that the contact had caused no damage to the ship. *Endeavor's* hull was resting against the curving wall with a thrust of several tons, but the pressure was evenly distributed. Reassured, he began to drift around the circular structure, trying to determine its purpose.

He had traveled only a few meters when he came across an interruption in the smooth, apparently metallic wall. At first he thought it was some peculiar decoration, for it seemed to serve no useful function. Six radial grooves—or slots—were deeply recessed in the metal and lying in them were six crossed bars like the

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spokes of a rimless wheel, with a small hub at the center. But there was no way in which the wheel could be turned – it was embedded in the wall.

Then he noticed, with growing excitement, that there were deeper recesses at the ends of the spokes nicely shaped to accept a clutching hand. Claw? Tentacle? If one stood braced against the wall and pulled on the spokes so . . .

Smooth as silk the wheel slid out of the wall. To his utter astonishment—for he had been virtually certain that any moving parts would have become vacuum-welded ages ago—Norton found himself holding a spoked wheel. He might have been the captain of some old windjammer standing at the helm of his ship.

He was glad that his helmet sunshade did not allow Mercer to read his expression.

He was startled, but also angry with himself—perhaps he had already made his first mistake. Were alarms now sounding inside *Rama* and had his thoughtless action already triggered some implacable mechanism?

But *Endeavor* reported no change. Its sensors still detected nothing except faint thermal crepitations and his own movements.

"Well, skipper—are you going to turn it?"

Norton thought once more of his instructions. *Use your own discretion, but proceed with caution.* If he checked every single move with mission control he would never get anywhere.

"What's your diagnosis, Karl?"

"It's obviously a manual control for an airlock—probably an emergency backup system in case of power failure. I can't imagine any technology, however advanced, that wouldn't take such precautions."

"And it has to be fail-safe," Norton decided out loud. "So that it can only be operated if there's no possible danger to the system."

He grasped two opposing spokes of the windlass, braced his feet and tested the wheel. It did not budge.

"Give me a hand," he asked Mercer. Each took a spoke. Exerting their utmost strength, they were unable to produce the slightest movement.

Of course, there was no reason to suppose that clocks and corkscrews on *Rama* turned in the same direction as they did on Earth.

"Let's try the other way," suggested Mercer.

This time there was no resistance. The wheel rotated easily through a full circle. Then, smoothly, it took up the load.

Half a meter away the curving wall of the pillbox started to move like a slowly opening clamshell. A few particles of dust, driven by wisps of escaping air, streamed outward like dazzling diamonds as the brilliant sunlight caught them.

The road to *Rama* lay open.

III

IT HAD been a serious mistake, Dr. Bose often thought, to put the United Planets Headquarters

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on the moon. Inevitably Earth tended to dominate the proceedings—as it dominated the landscape beyond the dome. If they had had to build here perhaps they should have gone to Farside, where that hypnotic globe never showed itself.

But it was much too late to change things now—and in any case no real alternative existed. Whether the colonies liked it or not Earth would be the cultural and economic overlord of the solar system for centuries to come.

Dr. Bose had been born on Earth and had not emigrated to Mars until he was thirty, so he felt that he could view the political situation fairly dispassionately. He knew now that he would never return to his home planet, even though it was only five hours away by shuttle. At one hundred and fifteen he was in perfect health, but he could not face the reconditioning needed to accustom him to three times the gravity he had enjoyed for most of his life. He was exiled forever from the world of his birth. Since he was not a sentimental man this had never depressed him unduly.

What did depress him sometimes was the need for dealing, year after year, with the same familiar faces. The marvels of medicine were all very well and certainly he had no desire to put back the clock—but there were men around this conference table with whom he had worked for more than half a century. He knew exactly what each would say and how each would vote on any given subject. He wished that, some day, one of them would do something totally unexpected—even something quite crazy.

And probably they felt exactly the same way about him.

The *Rama* Committee was still manageably small, though doubtless that would soon be rectified. His six colleagues—the U.P. representatives for Mercury, Earth, Luna, Ganymede, Titan and Triton—were all present in the flesh. They had to be—electronic diplomacy was not possible over solar system distances. Some elder statesmen, accustomed to the instantaneous communications which Earth had long taken for granted, had never reconciled themselves to the fact that radio waves took minutes—even hours—to journey across the gulfs between the planets. "Can't you scientists do something about it?" they had been heard to complain bitterly when told that face-to-face conversation was impossible between Earth and its remoter children. Only the moon had that barely acceptable one-and-a-half-second delay—with all the political and psychological consequences such proximity implied. Because of this fact of astronomical life the moon—and only the moon—would always be a suburb of Earth.

Also present in person were some of the specialists who had been co-opted to the committee. Professor Davidson, the astronomer, was an old acquaintance—today he did not seem his usual irascible self. Dr. Bose knew

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nothing of the infighting that had preceded the launch of the first probe to *Rama*, but the professor's colleagues had not let him forget it.

Dr. Thelma Price was familiar through her numerous television appearances, though she had first made her reputation fifty years ago during the archeological explosion that had followed the draining of that vast marine museum, the Mediterranean.

Dr. Bose could still recall the excitement of that time, when the lost treasures of the Greeks, Romans and a dozen other civilizations were restored to the light of day. That was one of the few occasions when he was sorry to be living on Mars.

The exobiologist, Carlisle Perera, was another obvious choice—so was Dennis Solomons, the science historian. Dr. Bose was slightly less happy about the presence of Conrad Taylor, the celebrated anthropologist, who had made his reputation by uniquely combining scholarship and crotocism in his study of puberty rites in Late twentieth-century Beverly Hills.

No one, however, could possibly have disputed the right of Sir Lewis Sands to be on the committee. A man whose knowledge was matched only by his urbanity, Sir Lewis was reputed to lose his composure only when called the Arnold Toynbee of his age.

The great historian was not present in person—he stubbornly refused to leave Earth even for so momentous a meeting as this. His stereo image, indistinguishable

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from reality, apparently occupied the chair to Dr. Bose's right. As if to complete the illusion someone had placed a glass of water in front of him. Dr. Bose considered that this sort of technological *tour-de-force* was an unnecessary gimmick, but it was surprising how many undeniably great men were childishly delighted to be in two places at once. Sometimes this electronic miracle produced comic disasters—he had been at one diplomatic reception where somebody had tried to walk through a stereogram and discovered, too late, that it was the real person. And it was even funnier to watch projections trying to shake hands.

HIS Excellency the Ambassador for Mars to the United Planets called his wandering thoughts to order, cleared his throat and said, "Gentlemen, the committee is now in session. I think I'm correct in saying that this is a gathering of unique talents, assembled to deal with a unique situation. The directive that the secretary general has given us is to evaluate that situation and to advise Commander Norton when necessary."

This was a miracle of oversimplification and everyone knew it. Unless there was a real emergency, the committee might never be in direct contact with Commander Norton—if, indeed, he had ever heard of it. For the committee was a temporary creation of the United Planet's Science Organization, reporting through its director to the secretary general. In theory, however, there was no reason why the *Rama* Committee—or anyone else for that matter—should not call up Commander Norton and offer helpful advice.

But deep space communications are expensive. *Endeavor* could be contacted only through PLANETCOM, an autonomous corporation famous for the strictness and efficiency of its accounting. It took a long time to establish a line of credit with PLANETCOM. Somewhere someone was working on this, but at the moment PLANETCOM's hard-hearted computers did not recognize the existence of the *Rama* Committee.

"This Commander Norton," said the ambassador for Earth. "He has a tremendous responsibility. What sort of person is he?"

"I can answer that," said Professor Davidson, his fingers flying over the keyboard of his memory pad. He frowned at the screenful of information and started to make an instant synopsis.

"William Tsien Norton, born two thousand seventy-seven, Brisbane, Oceana. Educated Sydney, Bombay, Houston. Then five years at Astrograd, specializing in propulsion. Commissioned twenty-one hundred two. Rose through usual ranks—lieutenant on the Third Persephone expedition—distinguished himself during fifteenth attempt to establish base on Venus—um—exemplary record—dual citizenship, Earth and Mars. Wife and one child in Brisbane, wife and two in Port Lowell, with option on third—"

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"Wife?" asked Taylor innocently.

"No, child of course," snapped the professor, before he caught the grin on the other's face. Mild laughter rippled around the table, though the overcrowded terrestrials looked more envious than amused. After a century of determined effort Earth had still failed to get its population below the target of one billion.

"—appointed commanding officer Solar Survey Research Vessel *Endeavor*. First voyage to retrograde satellites of Jupiter . . . um, that was a tricky one . . . on asteroid mission when ordered to prepare for this operation. Managed to beat deadline—"

The professor cleared the display and looked at his colleagues.

"I think we were extremely lucky, considering that he was the only man available at such short notice. We might have had the usual run-of-the-mill captain."

"The record only proves that he's competent," objected the representative from Mercury (Population: 112,500 but growing). "How will he react in a wholly novel situation like this?"

On Earth Sir Lewis Sands cleared his throat. A second and a half later he did so on the moon.

"Not exactly a novel situation," he reminded the Hermian. "even though it's three centuries since it last occurred. If *Rama* is dead, or unoccupied—and so far all the evidence suggests that it is—Norton is in the position of an archeologist discovering the ruins of an extinct culture." He bowed politely to Dr. Price, who nodded in agreement. "Obvious examples are Schliemann at Troy or Mouhot at Angkor Vat. The danger is minimal, though of course accident can never be completely ruled out."

"But what about the booby-traps and trigger mechanisms these Pandora people have been talking about?" asked Dr. Price.

"Pandora?" asked the Hermian quickly. "What's that?"

"It's a crackpot movement of people who are convinced that *Rama* is a grave potential danger. A box that shouldn't be opened, you know."

"Pandora—paranoia" snorted Conrad Taylor. "Oh, such things are conceivable, but why should any intelligent race want to play childish tricks?"

"Well, even ruling out such unpleasantness," Sir Lewis continued, "we still have the much more ominous possibility of an active, inhabited *Rama*. Then the situation is one of an encounter between two cultures—at very different technological levels. Pizarro and the Incas. Peary and the Japanese. Europe and Africa. Almost invariably, the consequences have been disastrous—for one or both parties. I'm not making any recommendations—I'm merely pointing out precedents."

"Thank you, Sir Lewis," replied Dr. Bose. "I'm sure we've all thought of these alarming possibilities. But if the creatures inside *Rama* are malevolent—will it really make the slightest difference what we do?"

"They might ignore us if we go away."

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"What? After they've traveled billions of miles and thousands of years?"

The argument had reached the take-off point and was now self-sustaining. Dr. Bose sat back in his chair, said very little and waited for the consensus to emerge.

It was just as he had predicted. Everyone agreed that, once he had opened the first door, it was inconceivable that Commander Norton should not open the second.

IV

IF HIS wives ever compared his videograms, Commandor Norton thought with more amusement than concern, it would involve him in a lot of extra work. Now he could make one long 'gram and dupe it, adding only brief personal messages and endearments before shooting almost identical copies off to Mars and Earth.

It was, of course, highly unlikely that his wives would ever check with each other—even at the concessionary rates allowed to spacemen's families such communication would be expensive. And there would be no point in it. His families were on excellent terms with each other and exchanged the usual greetings on birthdays and anniversaries. Yet, on the whole, perhaps it was just as well that the girls had never met and probably never would. Myrna had been born on Mars and so could not tolerate the high gravity of Earth. And Caroline hated even the twenty-five minutes of the longest possible terrestrial air journey—which made the long trip to Mars unfeasible for her.

"Sorry I'm a day late with this transmission," said the commander after he had finished the general-purpose preliminaries, "but I've been away from the ship for the last thirty hours, believe it or not.

"Don't be alarmed—everything is under control, going perfectly. It's taken us two days, but we're almost through the airlock complex. We could have done it in a couple of hours if we'd known what we know now. But we took no chances, sent remote cameras ahead and cycled all the locks a dozen times to make sure they wouldn't seize up behind us after we'd gone through.

"Each lock is a simple revolving cylinder with a slot on one side. You go in through this opening, crank the cylinder around a hundred eighty degrees—and the slot then matches up with another door so you can step out of it. Or float, in this case.

"The Ramans really made sure of things. There are three of these cylinder locks, one after the other, just inside the outer hull. I can't imagine how even one would fail unless someone blew it up with explosives, but if it did there would be a second backup and then a third.

"And that's only the beginning. The final lock opens into a straight corridor, almost half a kilometer long. It looks clean and tidy like everything else we've seen. Every few meters there are small ports that probably held lights, but now everything is com-

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pletely black and, I don't mind telling you, scary. There are also two parallel slots, about a centimeter wide, cut in the walls and running the whole length of the tunnel. We suspect that some kind of shuttle runs inside these, to tow equipment—or people—back and forth. It would save us a lot of trouble if we could get it working.

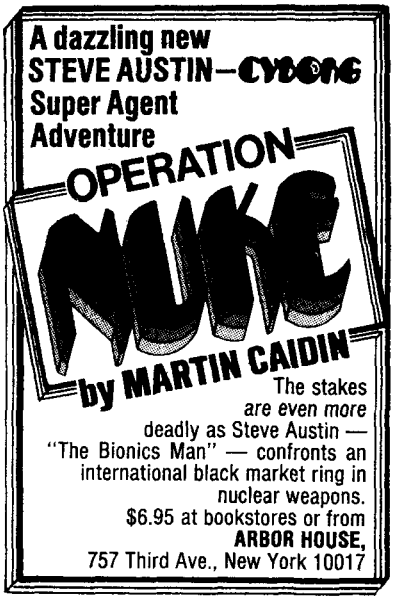
"I mentioned that the tunnel was half a kilometer long. Well, from our seismic soundings we know that's about the thickness of the shell, so obviously we were almost through it. And at the end of tunnel we weren't surprised to find another of those cylindrical airlocks.

"Yes, and another. And another. These people seem to have done everything in threes. We're in the final lock chamber now, waiting for the okay from Earth before we go through. The interior of *Rama* is only a few meters away. I'll be a lot happier when the suspense is over.

"You know Jerry Kirchoff, my exec, who's got such a library of real books that he can't afford to emigrate from Earth? Well, Jerry told me about a situation just like this back at the beginning of the twenty-first—no, twentieth century. An archeologist found the tomb of an Egyptian king, the first one that hadn't been looted by robbers. His workmen took months to dig their way in, chamber by chamber, until they came to the final wall. Then they broke through the masonry and he held out a lantern and pushed his head inside. He found himself looking into a whole roomful of treasure—incredible stuff, gold and jewels.

"Perhaps this place is also a tomb—that seems more and more likely. Even now there's still not the slightest sound or hint of any activity. Well, tomorrow we should know."

Commander Norton switched the recorder to HOLD. What else, he wondered, should he say about the work before he began the separate personal messages to his families? Normally he never went into so much detail, but these circumstances were scarcely normal. This might be the last 'gram he would ever send to those he loved—he owed it to them to explain what he was doing.



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By the time they saw these images and heard these words, he would be inside *Rama*—for better or for worse.

NEVER before had Norton felt so strongly his kinship with that long-dead Egyptologist. Not since Howard Carter had peered into the tomb of Tutankhamen could any man have known a moment such as this—yet the comparison was almost laughably ludicrous.

Tutankhamen had been buried only yesterday—not even four thousand years ago—and *Rama* might be older than mankind. That little tomb in the Valley of the Kings could have been lost in the corridors through which they had already passed, yet the space that lay beyond this final seal was many times greater. And as for the treasure it might hold—that was beyond imagination.

No one had spoken over the radio circuits for at least five minutes—the well-trained team had not even reported verbally when all the checks were complete. Mercer had simply given him the sign and waved him toward the open tunnel. It was as if everyone realized that this was a moment for history, not to be spoiled by unnecessary small talk. That suited Commander Norton, for at the moment he, too, had nothing to say. He flicked on the beam of his flashlight, triggered his jets and drifted slowly down the corridor, trailing his safety line behind him. Only seconds later he was inside.

Inside what? All before him was total darkness—not a glimmer of light was reflected back from the beam. He had expected this, but he had not really believed it. All the calculations had shown that the far wall was tens of kilometers away—now his eyes told him that this was indeed the truth. As he drifted slowly into darkness he felt a sudden need for the reassurance of his safety line, a stronger such feeling than he had ever experienced before, even on his very first EVA. And that was ridiculous—he had looked out across the light-years and the megaparsecs without vertigo. Why should he be disturbed by a few cubic kilometers of emptiness?

He was still queasily brooding over this problem when the momentum damper at the end of the line braked him gently to a halt with a barely perceptible rebound. He swept the beam of the flashlight down to examine the surface from which he had emerged.

He might have been hovering over the center of a small crater—which was itself a dimple in the base of a much larger one. On either side rose a complex of terraces and ramps—all geometrically precise—which extended for as far as the beam could reach. About a hundred meters away he could see the exits of two other airlock systems identical with this one.

And that was all. He noted nothing particularly exotic or alien about the scene—in fact, it bore a considerable resemblance to an

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abandoned mine. Norton felt a vague sense of disappointment. After all this effort there should have been some dramatic, even transcendental revelation. Then he reminded himself that he could see only a couple of hundred meters. The darkness beyond his field of view might yet contain more wonders than he cared to face.

He reported briefly to his anxiously waiting companions, then added: "I'm sending out the flare —two-minute delay. Here goes."

With all his strength he threw the little cylinder upward and out and started to count seconds as it dwindled along the beam. Before he had reached the quarter-minute it was out of sight. When he had come to a hundred he shielded his eyes and aimed the camera. He had always been good at estimating time. He was only two seconds off when the world exploded with light. And this time there was no cause for disappointment.

EVEN the millions of candlepower of the flare could not light up the middle of this enormous cavity, but now he could see enough to grasp its plan and appreciate its titanic scale. He was at one end of a hollow cylinder at least ten kilometers wide and of indefinite length. From his viewpoint at the central axis he could see such a mass of detail on the curving walls surrounding him that his mind could not absorb more than a minute fraction of it—he was looking at the landscape of an entire world by a single flash of lightning. He tried by a deliberate effort of will to freeze the image in his mind.

All around him the terraced slopes of crater reared up until they merged into the solid wall that rimmed the sky. No—that impression was false. He must discard the instincts both of Earth and of space and reorientate himself to a new system of coordinates.

He was not at the lowest point of this strange, inside-out world, but the highest. From here, all directions were down, not up. If he moved away from this central axis and toward the curving wall —which he must no longer think of as a wall—gravity would steadily increase. When he reached the inside surface of the cylinder, he could stand upright on it at any point, feet toward the stars and head toward the center of the spinning drum. The concept was familiar enough—from the earliest dawn of spaceflight centrifugal force had been used to simulate gravity. It was only the scale of this application that was so overwhelming, so shocking. The largest of all space stations, Syncsat Five, was less than two hundred meters in diameter. It would take some little while to grow accustomed to one a hundred times that size.

The tube of landscape that enclosed him was mottled with areas of light and shade that could have been forests, fields, frozen lakes or towns—the distance and the fading illuminations of the flare made identification impossible. Narrow lines that could be highways, canals, or well-trained rivers formed a faintly visible geo-

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metric network and, far along the cylinder, at the very limit of vision, was a band of deeper darkness. It formed a complete circle, ringing the interior of this world, and Norton suddenly recalled the myth of Oceanus, the sea which, the ancients believed, surrounded the Earth.

Here, perhaps, was an even stranger sea—not circular, but cylindrical. Before it became frozen in the interstellar night, did it have waves and tides and currents—and fish?

The flare guttered and died. The moment of revelation was over. But Norton knew that as long as he lived these images would be burned in his mind. Whatever discoveries the future might bring, they could never erase this first impression. And history could never take from him the privilege of having been the first of all mankind to gaze upon the works of an alien civilization.

V

"WE HAVE now launched five long-delay flares down the axis of the cylinder and so have a good photo coverage of its full length. All the main features are mapped. Though there are very few that we can identify, we've given them provisional names.

"The interior cavity is fifty kilometers long and sixty wide. The two ends are bowl-shaped, with rather complicated geometries. We've called ours the Northern Hemisphere and are establishing our first base here at the axis.

"Radiating away from the central hub and one hundred and twenty degrees apart, are three ladders that are almost a kilometer long. They all end at a terrace or ring-shaped plateau that runs right around the bowl. And leading on from that, continuing the direction of the ladders, are three enormous stairways, which go all the way down to the plain. If you imagine an umbrella with only three ribs, equally spaced, you'll have a good idea of this end of *Rama*.

"Each of those ribs is a stairway, very steep near the axis and then slowly flattening out as it approaches the plain below. The stairways—we've called them Alpha, Beta, Gamma—aren't continuous, but break at five more circular terraces. We estimate there must be between twenty and thirty thousand steps. Presumably the stairs were only used for emergencies, since it's inconceivable that the Ramans—or whatever we're going to call them—had no better way of reaching the axis of their world.

"The Southern Hemisphere looks quite different. For one thing, it has no stairways and no flat central hub. Instead, there's a huge spike—kilometers long—jutting along the axis, with six smaller ones around it. The whole arrangement is very odd and we can't imagine what it means.

"The fifty-kilometer-long cylindrical section between the two bowls we've called the Central Plain. It may seem crazy to use the word 'plain' to describe something so obviously curved, but we

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feel it's justified. It will appear flat to us when we get down there—just as the interior of a large bottle must seem flat to an ant crawling around inside it.

"The most striking feature of the Central Plain is the ten-kilometer-wide dark band running completely around it at the halfway mark. It looks like ice, so we've christened it The Cylindrical Sea. Right out in the middle of it is a large oval island, about ten kilometers long and three wide and covered with tall structures. Because it reminds us of Old Manhattan, we've called it New York. Yet I don't think it's a city—it seems more like an enormous factory or chemical processing plant.

"But there are some cities—or towns—at least six of them. If they were built for human beings they could each hold about fifty thousand people. We've called them Rome, Peking, Paris, Moscow, London, Tokyo. They are linked with highways and something that seems to be a rail system.

"There must be enough material for centuries of research in this frozen carcass of a world and we've only a few weeks to do the job. I wonder if we'll ever learn the answer to the two mysteries that have been haunting me ever since we got inside: who were they—and what went wrong?"

THE recording ended. On Earth and moon the members of the *Rama* Committee relaxed, then started to examine the maps and photographs spread in front of them. Though they had already studied these for many hours, Commander Norton's voice added a dimension no pictures could convey. He had actually been there—had looked with his own eyes across this extraordinary inside-out world, during the brief moments its age-long night had been illuminated by the flares. And he was the man who would lead any expedition to explore it.

"Dr. Perera, I believe you have some comments to make?"

Dr. Bose wondered briefly if he should have first given the floor to Professor Davidson, the senior scientist and the only astronomer. But the old cosmologist still seemed to be in a mild state of shock and was clearly out of his element. All his professional career he had looked upon the universe as an arena for the titanic impersonal forces of gravitation, magnetism and radiation—he had never believed that life played an important role in the scheme of things and regarded its appearance on Earth, Mars and Jupiter as an accidental aberration.

But now there was proof that life not only existed outside the solar system, but had scaled heights far beyond anything that man had achieved or could hope to reach for centuries to come. Moreover, the discovery of *Rama* challenged another dogma that the professor had preached for years. When pressed, he would reluctantly admit that life probably did exist in other star systems—but it was absurd, he had always maintained,

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to imagine that it could ever cross the interstellar gulfs.

Perhaps the Ramans had indeed failed—if Commander Norton proved correct in believing that their world was now a tomb. But at least they had attempted the feat on a scale that had at the outset indicated a high confidence in the outcome. If such a thing had happened once it must surely have happened many times in this galaxy of a hundred thousand million suns—and someone, somewhere, would eventually succeed.

This was the thesis which, without proof but with considerable arm-waving, Dr. Carlisle Perera had been preaching for years. He was now a very happy man, though also a most frustrated one. *Rama* had spectacularly confirmed his views—but he could never set foot inside it or even see it with his own eyes. If the devil had suddenly appeared and offered him the gift of instantaneous teleportation he would have signed the contract without bothering to look at the small print.

"Yes, Mr. Ambassador, I think I have some information of interest. What we have here is undoubtedly a Space Ark. It's an old idea in astronautical literature—I've been able to trace it back to the British physicist J.D. Bernal, who proposed this method of interstellar colonization in a book published in nineteen twenty-nine—yes, two hundred years ago! And the great Russian pioneer Tsiolkovski put forward somewhat similar proposals even earlier.

"If you want to go from one star system to another you have a number of choices. Assuming that the speed of light is an absolute limit—and that's still not completely settled, despite anything you may have heard to the contrary—" there was an indignant sniff, but no formal protest from Professor Davidson—"you can make a fast trip in a small vessel or a slow journey in a giant one.

"There seems no technical reason why spacecraft cannot reach ninety percent or more of the speed of light. That would mean a travel time of five to ten years between neighboring stars—tedious, perhaps, but not impractical, especially for creatures whose life-spans might be measured in centuries. One can imagine voyages of this duration carried out in ships not much larger than ours.

"But perhaps such speeds are impossible with reasonable payloads—remember, you have to carry the fuel to slow down at the end of the voyage, even if you're on a one-way trip. So it may make more sense to take your time—ten thousand or a hundred thousand years.

"Bernal and others thought this could be done with mobile worldlets a few kilometers across, carrying thousands of passengers on journeys that would last for generations. Naturally the system would have to be rigidly closed, recycling all food, air and other expendables. But, of course, that's just how the Earth operates—on a slightly larger scale.

"Some writers suggested that

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these Space Arks should be built in the form of concentric spheres. Others proposed hollow, spinning cylinders so that centrifugal force could provide artificial gravity—exactly what we've found in *Rama*—"

PROFESSOR DAVIDSON could not tolerate this sloppy talk.

"No such thing as centrifugal force. It's an engineer's phantom. There's only inertia."

"You're quite right, of course," admitted Perera, "though it might be hard to convince a man who'd just been slung off a carousel. But mathematical rigor seems unnecessary—"

"Hear, hear," interjected Dr. Bose with some exasperation. "We all know what you mean, or think we do. Please don't destroy our illusions."

"Well, I was merely pointing out that there's nothing conceptually novel about *Rama,* though its size is startling. Men had imagined such things for two hundred years. Now I'd like to address myself to another question. Exactly how long has *Rama* been traveling through space?

"We now have a very precise determination of its orbit and its velocity. Assuming that it's made no navigational changes, we can trace its position back for millions of years. We expected that any visitor would be coming from the direction of a nearby star—but that isn't the case here at all.

"It's more than two hundred thousand years since *Rama* passed near a star and that particular one turns out to be an irregular variable—about the most unsuitable sun you could imagine for an inhabited solar system. It has a brightness range of over fifty to one—any planets would be alternately baked and frozen every few years."

"A suggestion," put in Dr. Price. "Perhaps that explains everything. Maybe this was once a normal sun and became unstable. That's why the Ramans had to find a new one."

Dr. Perera admired the old archeologist, so he let her down lightly. What would she say, he wondered, if he started pointing out the instantly obvious in her own specialty?

"We did consider that," he said gently. "But if our present theories of stellar evolution are correct this star could never have been stable—could never have had life-bearing planets. So *Rama* has been cruising through space for at least two hundred thousand years—and perhaps for more than a million.

"Now it's cold and dark and apparently dead—and I think I know why. The Ramans may have had no choice—perhaps they were indeed fleeing from some disaster—but they miscalculated.

"No closed ecology can be one hundred percent efficient. There is always waste, loss—some degradation of the environment and build-up of pollutants. It may take billions of years to poison and wear out a planet—but it will happen in the end. The oceans dry up. The atmosphere will leak away.

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"By our standards *Rama* is enormous—yet it is still a very tiny planet. My calculations, based on the leakage through its hull and some reasonable guesses about the rate of biological turnover, indicate that its ecology could survive only about a thousand years. At the most I'll grant ten thousand.

"That would be long enough, at the speed *Rama* is traveling, for a transit between the closely packed suns in the heart of the galaxy. But not out here, in the scattered population of the spiral arms. *Rama* is a ship that exhausted its provisions before it reached its goal. It's a derelict, drifting among the stars.

"There's just one serious objection to this theory and I'll raise it before anybody else does. *Rama's* orbit is aimed so accurately at the solar system that coincidence seems ruled out. In fact, I'd say it's now heading much too close to the sun for comfort. *Endeavor* will have to break away long before perihelion to avoid overheating.

"I don't pretend to understand this. Perhaps some form of automatic terminal guidance is still operating, steering *Rama* to the nearest suitable star ages after its builders are dead.

"And they are dead—I'll stake my reputation on that. All the samples we've taken from the interior are absolutely sterile—we've not found a single micro-organism. As for the talk you may have heard about suspended animation, you can ignore it. There are fundamental reasons why hibernation techniques will work for only a very few centuries—and we're dealing with time spans a thousandfold longer.

"So the Pandorans and their sympathizers have nothing to worry about. For my part, I'm sorry. It would have been wonderful to have met another intelligent species.

"But at least we have answered one ancient question. We are not alone. The stars will never again be the same to us."

VI

COMMANDER NORTON was sorely tempted—but, as captain, his first duty was to his ship. If anything went badly wrong on this initial probe he might have to retreat the vessel.

So that left his second officer, Mercer, the obvious choice. Norton willingly admitted that Karl was better suited for the mission.

An authority on life-support systems, Mercer had written some of the standard texts on the subject. He had personally checked out innumerable types of equipment, often under hazardous conditions, and his biofeedback control was famous. At a moment's notice he could cut his pulse rate by fifty percent and reduce respiration to almost zero for up to ten minutes. This useful little trick had saved his life on more than one occasion.

Yet, despite his great ability and intelligence, he was almost wholly lacking in imagination.

To him the most dangerous experiments or missions were sim-

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ply jobs that had to be done. He never took unnecessary risks and had no use at all for what was commonly regarded as courage.

The two mottos on his desk summed up his philosophy of life. One asked WHAT HAVE YOU FORGOTTEN? The other said HELP STAMP OUT BRAVERY. The fact that he was widely regarded as the bravest man in the fleet was the only thing that ever made him angry.

Given Mercer, the selection of the next man was automatic. Lieutenant Joe Calvert was Mercer's inseparable companion. It was hard to see what the two had in common—the lightly built, rather highly strung navigating officer was ten years younger than his stolid and imperturbable friend, who certainly did not share Joe's passionate interest in the art of primitive cinema.

But no one can predict where the lightning will strike and years ago Mercer and Calvert had established an apparently stable partnership. That was common enough—much more unusual was the fact that they also shared a wife back on Earth who had borne each of them a child. Commander Norton hoped that he could meet her one day—she had to be a remarkable woman. The triangle had lasted for at least five years and still seemed to be an equilateral one.

Two men were not enough to make an exploring team. Three was the optimum—for if one man were lost two might still escape where a single survivor would be doomed. After a good deal of thought Norton chose Technical Sergeant Willard Myron. A mechanical genius who could make anything work—or design something better if it wouldn't—Myron was the ideal man to identify alien pieces of equipment. On a long sabbatical from his regular job as associate professor at Astrotech, the sergeant had refused to accept a commission on the grounds that he did not wish to block the promotion of more deserving career officers. No one took this explanation very seriously and it was generally agreed that Will rated zero for ambition. He might make it to space sergeant, but would never be a full professor. Myron, like countless NCOs before him, had discovered the ideal compromise between power and responsibility.

AS THEY drifted through the last airlock and floated out along the weightless axis of *Rama*, Joe Calvert found himself, as he so often did, in the middle of a movie flashback. He sometimes wondered if he should attempt to cure himself of this habit, but he could not see that it had any disadvantages. It could make even the dullest situations interesting and—who could tell? One day it might save his life. He would remember what Fairbanks or Connery or Hiroshi had done in similar circumstances.

This time he was about to go over the top in one of the early twentieth-century wars. Mercer was the sergeant, leading a three-man patrol on a night raid into No Man's Land. It was not too diffi-

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cult to imagine that they were at the bottom of an immense shell crater, though one that had somehow become neatly tailored into a series of ascending terraces. The crater was flooded with light from three widely spaced plasma arcs, which gave an almost shadowless illumination over the whole interior. But beyond that—over the rim of the most distant terrace—lay darkness and mystery.

In his mind's eye Calvert knew perfectly well what lay there. First there was the circular plain over a kilometer across. Trisecting it into three equal parts—and looking very much like broad railroad tracks—were three wide ladders, their rungs recessed into the surface so that they would provide no obstruction to anything sliding over it. Since the arrangement was completely symmetrical there was no reason to chose one ladder rather than another. The one nearest to Airlock Alpha had been selected purely as a matter of convenience.

Though the rungs of the ladders were uncomfortably far apart they presented no problem. Even at the rim of the hub, half a kilometer from the axis, gravity was still barely one-thirtieth of the Earth's. Although they were carrying almost a hundred kilos of equipment and life-support gear, they would still be able to move easily hand-over-hand.

Commander Norton and the back-up team accompanied them along the guide ropes that had been stretched from Airlock Alpha to the rim of the crater. Beyond the range of the floodlights lay the darkness of *Rama*. All that could be seen in the dancing beams of the helmet lights was the first few hundred meters of the ladder, dwindling away across a flat and otherwise featureless plain.

And now, Karl Mercer told himself, *I have to make my first decision. Am I going up that ladder or down it?*

THE question was not a trivial one. They were still essentially in zero gravity and the brain could select any reference system it pleased. By a simple effort of will Mercer could convince himself that he was looking out across a horizontal plain or up the face of a vertical wall, or over the edge of a sheer cliff. Not a few astronauts had experienced grave psychologicgal problems by choosing the wrong coordinates when they started on a complicated job.

Mercer was determined to go head first, for any other mode of locomotion would be awkward—moreover he wanted to see what was in front of him. For the first few hundred meters, therefore, he would imagine he was climbing—only when the increasing pull of gravity made it impossible to maintain the illusion would he switch his mental directions one hundred and eighty degrees.

He grasped the first rung and gently propelled himself along the ladder. Movement was as effortless as swimming along the seabed—more so, in fact, for there was no backward drag of water. It was so easy that there was a

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temptation to go too fast, but Mercer was much too experienced to hurry in a situation as novel as this.

In his earphones he could hear the regular breathing of his two companions. He needed no other proof that they were in good shape and wasted no time in conversation. Though he was tempted to look back he decided not to risk it until they had reached the platform at the end of the ladder.

The rungs were spaced a uniform half-meter apart and for the first portion of the climb Mercer missed the alternate ones. But he counted them carefully and at around two hundred noticed the first distinct sensation of weight. The spin of *Rama* was starting to make itself felt.

At rung four hundred he estimated that his apparent weight was about five kilos. This was no problem, but it was now getting hard to pretend that he was climbing when he was being firmly dragged upward.

The five-hundredth rung seemed a good place to pause. He could feel the muscles in his arms responding to the unaccustomed exercise, even though *Rama* was now doing all the work and he had merely to guide himself.

"Everything okay, skipper," he reported. "We're just passing the halfway mark. Joe—Will, any problems?"

"I'm fine. What are you stopping for?" Joe Calvert answered.

"Same here," added Sergeant Myron. "But watch out for the Coriolis force. It's starting to build up."

So Mercer had already noticed. When he let go of the rungs he had a distinct tendency to drift off to the right. He knew perfectly well that this was merely the effect of *Rama's* spin, but it felt as if some mysterious force were gently pushing him away from the ladder.

Perhaps it was time to start going feet first, now that "down" was beginning to have a physical meaning. He would run the risk of a momentary disorientation.

"Watch out. I'm going to swing around."

HOLDING on firmly to the rung, he used his arms to twist himself around a hundred and eighty degrees and found himself momentarily blinded by the lights of his companions. Far above them he could see a fainter glow along the rim of the sheer cliff. Silhouetted against it were the figures of Commander Norton and the backup team, watching him intently. They seemed small and far away and he gave them a reassuring wave.

He released his grip and let *Rama's* still feeble pseudogravity take over. The drop from one rung to the next required more than two seconds—on Earth, in the same time, a man would have fallen thirty meters.

The rate of fall was so painfully slow that he hurried things up a trifle by pushing with his hands, gliding over spans of a dozen rungs at a time and checking himself with his feet whenever he felt he was traveling too fast.

At rung seven hundred he came

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to another halt and swung the beam of his helmet lamp downward. The beginning of the stairway was only fifty meters below.

A few minutes later they stood on the top step. It was a strange experience, after months in space, to stand upright on a solid surface, and to feel it pressing against one's feet. Their weight was still less than ten kilograms, but that was enough to give a feeling of stability. When he closed his eyes Mercer could believe that he once more had a real world beneath him.

The ledge or platform from which the stairway descended was about ten meters wide and curved up on each side until it disappeared into the darkness. Mercer knew that it formed a complete circle and that if he walked along it for five kilometers he would come right back to his starting point.

At the fractional gravity that existed here, however, real walking was impossible—one could only bound along in giant strides. And therein lay danger.

The stairway that swooped down into the darkness, far below the range of their lights, would be deceptively easy to descend. But it would be essential to hold on to the tall handrail that flanked it on either side—too bold a step might send an incautious traveler arching far out into space. He would hit the surface again perhaps a hundred meters lower down. The impact would be harmless, but its consequences might not be—for the spin of *Rama* would have moved the stairway off to the left. And so a falling body would hit against the smooth curve that swept in an unbroken arc to the plain almost seven kilometers below.

That, Mercer told himself, would be a hell of a toboggan ride. The terminal speed, even in this gravity, could be several hundred kilometers an hour. Perhaps it would be possible to apply enough friction to check such a headlong descent—if so, this might even be the most convenient way to reach the inner surface of *Rama*. But some very cautious experimenting would be necessary first.

Mercer reported: "There were no problems getting down the ladder. I'd like to continue toward the next platform. I want to time our rate of descent on the stairway."

Norton replied without hesitation.

"Go ahead." He did not need to add: "Proceed with caution."

IT DID not take Mercer long to make a fundamental discovery. It was impossible, at least at this gravity level, to walk down the stairway in the normal manner. Any attempt to do so resulted in a slow-motion, dreamlike movement that was intolerably tedious. The only practical way was to ignore the steps and to use the handrail to pull oneself downward.

Calvert had come to the same conclusion.

"This stairway was built to walk up, not down," he said. "You can use the steps when you're moving

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against gravity, but they're just a nuisance in this direction. It may not be dignified, but I think the best way down is to slide along the handrail."

"That's ridiculous," protested Myron. "I can't believe the Ramans did it this way."

"I doubt they ever used this stairway—it's obviously only for emergencies. They must have had some mechanical transport system to get up here. A funicular, *perhaps. That would explain* those long slots running down from the hub."

"I've been assuming they were drains—but I suppose they could be both. I wonder if it ever rained here?"

"Probably," said Mercer. "But I think Joe is right—and to hell with dignity. Here we go."

The handrail—presumably it had been designed for something like hands—was a smooth flat metal bar supported on widely spaced pillars a meter high. Mercer straddled it, carefully gauged the braking power he could exert with his hands and let himself slide.

Very sedately, slowly picking up speed, he descended into the darkness, moving in the pool of light from his helmet lamp. He had gone about fifty meters when he called the others to join him. In less than two minutes, they had made a kilometer descent in safety and comfort.

"I hope you enjoyed yourselves," Commander Norton called when they stepped off at the second platform. "Climbing back won't be quite so easy."

"That's what I want to check," replied Mercer, who was walking experimentally back and forth, getting the feel of the increased gravity. "It's already a tenth of a gee here—you really notice the difference."

He walked to the edge of the platform and shone his helmet light down the next section of the stairway. As far as his beam could reach the steps appeared identical with the ones above—though *careful examination of photos had in*dicated that their height steadily decreased with the rising gravity. The stair had apparently been designed so that the effort required to climb it was more or less constant at every point in its long curving sweep.

Mercer glanced up toward the hub of *Rama*, now almost two kilometers above him. The little glow of light and the tiny figures silhouetted against it seemed horribly far away. For the first time he was glad that he could not see the whole length of this enormous stairway. Despite his steady nerves and lack of imagination he was not sure how he would react if he could see himself like an insect crawling up the face of a vertical saucer sixteen kilometers high—and with the upper half hanging above him. Until this moment, he had regarded the darkness as a nuisance—now he welcomed it.

"There's no change of temperature," he reported to Norton. "Still just below freezing. But the air pressure is up as we expected—around three hundred millbars. Even with this low oxygen content it's almost breath-

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able—farther down there will be no problem at all. That will simplify exploration enormously. What a find—the first world on which we can walk without breathing gear. I'm going to take a sniff."

UP ON the Hub Commander Norton stirred a little uneasily. But Mercer, of all men, knew what he was doing. He would already have made enough tests to satisfy himself.

Mercer equalized pressure, unlatched the securing clip of his helmet and opened it a crack. He took a cautious breath, then a deeper one.

The air of *Rama* was dead and musty, as if from a tomb so ancient that the last trace of physical corruption had disappeared ages ago. Even Mercer's ultra-sensitive nose, trained through years of testing life-support systems to and beyond the point of disaster, could detect no recognizable odors. There was a faint metallic tang and he suddenly recalled that the first men on the moon had reported a hint of burned gunpowder when they repressurized the lunar module. Mercer imagined that the moondusty cabin on *Eagle* must have tasted rather like *Rama*.

He sealed the helmet again and emptied his lungs of the alien air. He had extracted no sustenance from it—even a mountaineer acclimatized to the summit of Everest would die quickly here. But a few kilometers farther down it would be a different matter.

What else was there to do here? He could think of nothing except the enjoyment of the gentle, unaccustomed gravity. But there was no point in growing used to that, since they would be returning immediately to the weightlessness of the hub.

"We're coming back," he reported. "There's no reason to go on until we're ready to go all the way."

"I agree. We'll be timing you, but take it easy."

As he bounded up the steps, three or four at a stride, Mercer agreed that Calvert had been perfectly correct—these stairs were built to be walked up, not down. As long as one did not look back and ignored the vertiginous steepness of the ascending curve the climb was a delightful experience. After about two hundred steps, however, he began to feel some twinges in his calf muscles and decided to slow down. The others had done the same. When he ventured a quick glance over his shoulder he saw them considerably farther down the slope.

The climb was wholly uneventful—merely an apparently endless succession of steps. When they stood once more on the highest platform, immediately beneath the ladder, they were barely winded and to reach this point had taken them only ten minutes. They paused for another ten, then started on the last vertical kilometer.

Jump—catch hold of a rung—jump—catch—jump—catch . . . it was easy, but so boringly repetitious that carelessness became a danger. Halfway up the ladder

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they rested for five minutes. Once again Mercer was glad that he could see so little of the vertical face to which he was clinging. It was not too difficult to pretend that the ladder extended only a few meters beyond the circle of light and would soon come to an end.

Jump—catch a rung—jump—then, quite suddenly, the ladder did end. They were back at the weightless world of the axis. The whole trip had taken under an hour and they felt a sense of modest achievement. Yet each of them knew that, for all their efforts, they had traversed less than an eighth of that cyclopean stairway.

VII

SOME women, Commander Norton had decided long ago, should not be allowed aboard ship—weightlessness did things to their breasts that were too damn distracting. It was bad enough when they were motionless, but when they started to move and sympathetic vibrations set in, it was more than any warm-blooded male should be asked to take. He was quite sure that at least one serious space accident had been caused by acute crew distraction, after the transit of an unholstered lady officer through the control cabin.

He had once mentioned this theory to *Endeavor's* Dr. Laura Ernst, without revealing who had inspired his particular train of thought. There was no need—they knew each other much too well. On Earth, years ago, in a moment of mutual loneliness and depression they had once made love. Probably they would never repeat the experience (but could one ever be quite sure of that?) because so much had changed for both of them. Yet whenever the well-built surgeon oscillated into the commanders' cabin he felt a fleeting echo of an old passion—she knew that he felt it and everyone was happy.

"*Bill*," she began, "I've checked our mountaineers and here's my verdict. Karl and Joe are in good shape—all indications normal for the work they've done. But Will shows signs of exhaustion and fluid loss—I won't bother with the details. I don't believe he's been getting all the exercise he should—and he's not the only one. There's been some cheating in the centrifuge. If there's any more, heads will roll. Please pass the word."

"Yes, ma'am. But there's some excuse. The men have been working very hard."

"With their brains and fingers, certainly. But not with their bodies—not real work in kilogram-meters. And that's what we'll be dealing with if we're going to explore *Rama*."

"Well, can we?"

"Yes, if we proceed with caution. Karl and I have worked out a very conservative profile—based on the assumption that we can dispense with breathing gear below Level Two. Of course, that's an incredible stroke of luck and changes the whole logistics picture. I still can't get used to the

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idea of a world with oxygen. But we only need to supply food and water and thermosuits and we're in business. Going down will be easy—it looks as if we can slide most of the way on that very convenient bannister."

"I've got Chips working on a sled with parachute braking. Even if we can't risk it for crew we can use it for stores and equipment."

"Fine. That should do the trip in ten minutes—otherwise it will take about an hour. Climbing up is harder to estimate. I'd like to allow six hours, including two one-hour rest periods. Later, as we get experience—and develop some muscles—we may be able to cut this back considerably."

"What about psychological factors?"

"Hard to assess in such a novel environment. Darkness may be the biggest problem."

"I'll establish searchlights on the hub. Besides its own lamps, any party down there will always have a beam playing on it."

"Good. That should be a great help."

"One other point—should we play safe and send a party only halfway down the stair and back—or should we go the whole way on the first attempt?"

"If we had plenty of time I'd be cautious. But time is short and I can see no danger in going all the way—and looking around when we get there."

"Thanks, Laura. That's all I want to know. I'll get the exec working on the details. And I'll order all hands to the centrifuge—twenty minutes a day at half a gee. Will that satisfy you?"

"No. It's point six gee down there in *Rama* and I want a safety margin. Make it, oh, three-quarters—"

"Ouch!"

"—for ten minutes—"

"I'll settle for that—"

"—twice a day."

"Laura, you're a cruel, hard woman. But so be it. I'll break the news just before dinner. That should spoil a few appetites."

IT WAS the first time that Commander Norton had ever seen Karl Mercer slightly ill at ease. He had spent fifteen minutes discussing logistics problems in his usual competent manner, but something was obviously worrying him. His captain, who had a shrewd idea of what it was, waited patiently until he brought it out.

Karl said at length, "Are you sure you should lead this party? If anything goes wrong I'm considerably more expendable. And I've been farther inside *Rama* than anyone else—even if only by fifty meters."

"Granted. But it's time the commander led his troops and we've decided that there's no greater risk on this trip than on the last. At the first sign of trouble I'll be back up that stairway fast enough to qualify for the Lunar Olympics."

He waited for further objections, but none came, though Karl still looked unhappy.

Norton added gently: "And I bet Joe will beat me to the top."

Mercer relaxed and a slow grin spread across his face. "All the

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same, Bill, I wish you'd chosen someone else."

"I wanted one man who had been down before and we can't both go. As for Sergeant Myron, Laura says he's still two kilos overweight. Even shaving off that mustache didn't help."

"Who's your number three?"

"I still haven't decided. That depends on Laura."

"She wants to go?"

"Who doesn't? But if she turns up at the top of her own fitness list I'll be very suspicious."

As Mercer gathered up his papers and launched himself out of the cabin Norton felt a brief stab of envy. Almost all the crew had worked out some sort of emotional accommodation. He had known ships where the captain had done the same, but that was not his way. Though discipline aboard *Endeavor* was based largely on mutual respect between highly trained and intelligent men and women, the commander needed something more to underline his position. His responsibility was unique and demanded a degree of isolation even from his closest friends to avoid charges of favortism. For this reason affairs spanning more than two degrees of rank were firmly discouraged. But apart from that, the only rule regulating sex was: "So long as they don't do it in the corridors and frighten the simps."

There were four superchimps aboard *Endeavor,* though strictly speaking the name was inaccurate, because the ship's nonhuman crew was not based on chimpanzee stock. In zero gravity a prehensile tail is an enormous advantage and all attempts to supply these to humans had turned into embarrassing failures. After equally unsatisfactory results with the great apes the Superchimpanzee Corporation had turned to the monkey kingdom.

Blackie, Blondie, Goldie and Brownie had family trees whose branches included the most intelligent of the Old and New World monkeys, plus synthetic genes that had never existed in nature. Their rearing and education had likely cost as much as those of the average spaceman and they were worth it. Each weighed less than thirty kilos and consumed only half the food and oxygen of a human being, but each could replace 2.75 men for housekeeping, elementary cooking, tool-carrying and dozens of other routine jobs.

That 2.75 was the corporation's claim, based on innumerable time-and-motion studies. The figure, though surprising and frequently challenged, appeared to be accurate, for simps were quite happy to work fifteen hours a day and did not get bored by the most menial and repetitious tasks. So they freed human beings for human work. And on a spaceship that was a matter of vital importance.

UNLIKE the monkeys who were their nearest relatives, *Endeavor's* simps were docile, obedient and uninquisitive. Being cloned, they were also sexless, which eliminated awkward be-

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havioral problems. Carefully house-trained vegetarians, they were clean and didn't smell—they would have made perfect pets, except that nobody could possibly have afforded them.

Still, having simps on board involved certain problems. They had to have their own quarters—inevitably labeled "The Monkey House." Their little mess room was always spotless and was equipped with TV, games, equipment and programed teaching machines. To avoid accidents they were absolutely forbidden to enter the ship's technical areas—the entrances to all these were color-coded in red and the simps were conditioned so that it was psychologically impossible for them to pass these visual barriers.

There was also a communications problem. Though they had an I.Q. equivalent of 60 and could understand several hundred words of English, they were unable to talk. It had proved impossible to give useful vocal chords either to apes or monkeys and they therefore had to express themselves in sign language.

The basic signs were obvious and easily learned, so that everyone on board ship could understand routine messages. But the only man who could speak fluent Simplish was their handler, Chief Steward McAndrews.

It was a standing joke that Sergeant Ravi McAndrews also looked rather like a simp—which was hardly an insult, for with their short, tinted pelts and graceful movements the simps were handsome animals. They were also affectionate and everyone on board had his favorite— Commander Norton's was the aptly named Goldie.

But the warm relationship one could so easily establish with simps created another problem, often used as a powerful argument against their employment in space. Since they could only be trained for routine, low-grade tasks they were worse than useless in an emergency—they could then be a danger to themselves and to their human companions. In particular, teaching them to use spacesuits had proved impossible, the concepts involved being quite beyond their understanding.

No one liked to talk about it, but everybody knew what had to be done if a hull were breached or the order came to abandon ship. It had happened only once—then the simp handler had carried out his instructions more than adequately. He was found with his charges, killed by the same poison. Thereafter, the job of euthing was transferred to the chief medical officer who, it was felt, would have less emotional involvement.

Norton was thankful that this responsibility, at least, did not fall upon the captain's shoulders. He had known men he would have killed with far fewer qualms than he would have felt about destroying Goldie.

VIII

IN THE clear, cold atmosphere of *Rama* the beam of the search-

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light was completely invisible. Three kilometers down from the central hub, the hundred-meter oval of light lay across a section of that colossal stairway. A brilliant oasis in the surrounding darkness, it was sweeping slowly toward the curved plain still five kilometers below and in its center moved a trio of antlike figures.

It had been, just as they had hoped and expected, a completely uneventful descent. They had paused briefly at the first platform and Norton had walked a few hundred meters along the narrow, curving ledge before starting the slide down to the second level. Here they had discarded their oxygen gear and reveled in the strange luxury of being able to breathe without mechanical aids. Now they could explore in comfort, freed from the greatest danger that confronts a man in space.

By the time they had reached the fifth level—and there was only one more section to go—gravity had reached almost half its terrestrial value. *Rama's* centrifugal spin was at last exerting its real strength—they were surrendering themselves to the implacable force that rules every planet and can exert a merciless price for the smallest slip. It was still easy to go downward; but the thought of the return up those thousands upon thousands of steps was already beginning to prey on their minds.

The stairway had long ago ceased its vertiginous downward plunge and was now flattening out toward the horizontal. The gradient was now only about one in five—at the beginning, it had been five in one. Normal walking was now both physically and psychologically acceptable—only the gravity reminded them that they were not descending some great stairway on Earth. Norton had once visited the ruins of an Aztec temple and the feelings he had then experienced now came echoing back to him—amplified a hundred times. Here was the same sense of awe and mystery and the sadness of the irrevocably vanished past. Yet the scale here was so much greater both in time and space that the mind was unable to do it justice—after a while the senses ceased to respond. Norton wondered if, sooner or later, he would take even *Rama* for granted.

In another respect the parallel with terrestrial ruins failed completely. *Rama* was hundreds of times older than any structure that had survived on Earth—even the Great Pyramid. But everything here looked absolutely new—there was no sign of wear and tear.

Norton had puzzled over this a good deal and had arrived at a tentative explanation. Everything that they had so far examined secured part of an emergency backup system, seldom put to actual use. He could not imagine that the Ramans—unless they were physical fitness fanatics—ever walked up and down this incredible stairway or its two identical companions. Perhaps the stairs had only been required during the actual construction

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of *Rama* and had served no purpose since that distant day. That theory would do for the moment, yet it did not feel right. Something was wrong somewhere.

They did not slide for the last kilometer but went down the steps two at a time in long, gentle strides—this way, Norton decided, they would give more exercise to muscles that would soon have to be used. And so the end of the stairway came upon them unannounced—suddenly there were no more steps. A flat plain, dull gray in the now weakening beam of the hub searchlight, faded into darkness a few hundred meters ahead.

Norton looked back along the beam. He knew that Mercer would be watching through the telescope. He waved.

"Captain speaking," he reported over the radio. "Everyone in fine shape—no problems. Proceeding as planned."

"Good," replied Mercer. "We'll be watching."

THERE was a brief silence. Then a new voice cut in. "This is the exec on board ship. Really, skipper, that isn't good enough. You know the news services have been screaming at us for the last week. I don't expect deathless prose, but can't you do better?"

"I'll try." Norton chuckled. "There's nothing to see as yet. It's like—well, being on a huge, darkened stage under a single spotlight. The first few hundred steps of the stairway rise out of it until they disappear into the darkness overhead. What we can see of the plain looks perfectly flat—the curvature's too small to be visible over this limited area. That's about it."

"Care to give any impressions?"

"Well, it's cold here—below freezing—and we're glad of our thermosuits. And it's quiet—quieter than anything I've ever known on Earth or in space, where there's always some background noise. Here every sound is swallowed up—the area around us is so enormous that there aren't any echoes. It's weird. I hope we can get used to it."

"Thanks, skipper. Anyone else—Joe, Boris?"

Joe Calvert, never at a loss for words, was happy to oblige.

"I can't help thinking that this is the first time—ever—that we've been able to walk on another world, breathing its natural atmosphere—though I suppose 'natural' is hardly the word you should apply to a place like this. Still, *Rama* must resemble the world of its builders—our own spaceships are all miniature Earths. Two examples are damned poor statistics, but does this mean that all intelligent life forms are oxygen-eaters? What we've seen of their work suggests that the Ramans were humanoid, though perhaps about fifty per cent taller than we are. Wouldn't you agree, Boris?"

To all his shipmates Lieutenant Boris Rodrigo was something of an enigma. The quiet, dignified communications officer was popular with the rest of the crew, but he never entered fully into its activities and always seemed

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a little apart—marching to the music of a different drummer.

As indeed he was, being a devout member of the Fifth Church of Christ, Cosmonaut. Norton had never been able to discover what had happened to the earlier four and he was equally in the dark about the Church's rituals and ceremonies. But the main tenet of its faith was widely known—it had constructed an entire theology on the assumption that Jesus Christ was a visitor from space.

It was perhaps not surprising that an unusually high proportion of the devotees worked in space in some capacity or other. Invariably they were efficient, conscientious and absolutely reliable. They were universally respected and even liked, especially as they made no attempt to convert others. But there was also something slightly spooky about them—Norton could never understand how men with advanced scientific and technical training could possibly believe some of the things he had heard Christers state as incontrovertible facts.

As he waited for Rodrigo to answer Norton wondered if some part of his mind had not selected the lieutenant for this mission out of curiosity—to see how a man with Rodrigo's religious beliefs would react to the awesome reality of *Rama.*

Boris Rodrigo finally answered Joe's possibly loaded question with his usual caution: "They were certainly oxygen-breathers and they could be humanoid. But let's wait and see. With any luck we should discover what they were like. There may be pictures, statues—perhaps even bodies in those towns. If they are towns."

"The nearest is only eight kilometers away," Joe Calver said hopefully.

A quick sortie to the "town" they had named Paris had been among the first of Norton's contingency plans. Could he now risk it? They had ample food and water for a stay of twenty-four hours. They would always be in full view of the backup team on the Hub and any kind of accident seemed virtually impossible on this smooth, gently curving metal plain. The only foreseeable danger was exhaustion, and time was a consideration. Even a brief foray could be worth much—there was so little time as Rama hurtled sunward, toward a perihelion too dangerous for *Endeavor* to match.

In any case, part of the decision was not his to make. Up in the ship, Dr. Ernst would be watching the outputs of the bio-telemetering sensors attached to his body. If she turned thumbs down, that would be that.

"Laura, what do you think?"

"Take thirty minutes' rest and a five-hundred-calorie energy module. Then you can start."

"Thanks, doc." From Joe Calvert. "Now I can die happy. I always wanted to see Paris. Montmartre, here we come."

AFTER those interminable stairs it was a strange luxury to walk once more on a horizon-

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tal surface. Directly ahead the ground was indeed completely flat. To right and left, at the limits of the floodlit area, the rising curve could barely be detected. They might have been walking the bottom of a wide, shallow valley—it was quite impossible to believe that they were really crawling along the inside of a huge cylinder and that beyond this little oasis of light the land rose up to meet—no, to become—the sky.

Though all three felt a sense of confidence and subdued excitement the almost palpable silence of *Rama* began shortly to weigh heavily upon them. Every footstep, every word vanished instantly into the unreverberant void—after they had gone little more than half a kilometer Calvert could stand it no longer.

Among his minor accomplishments was a talent for whistling. With or without encouragement he could reproduce the themes from most of the movies of the last two hundred years. He started at the beginning of his repertory and progressed, more or less chronologically, through half a dozen epics—culminating with the theme from Sid Krassman's famous late twentieth century *Napoleon*—before he realized the inappropriateness of his efforts. *Rama* made trivia of his tunes—they were lost in the unechoing stillness. Thereafter, apart from an occasional consultation with the ship, the trio marched in silence. *Rama* had won this round.

On his initial traverse Norton had allowed for one detour. Paris lay straight ahead, halfway between the foot of the stairway and the shore of the Cylindrical Sea, but only a kilometer to the right of their track lay a prominent and rather mysterious feature which had been christened the Straight Valley. It was a long groove or trench, forty meters deep and a hundred wide, with gently sloping sides—it had been provisionally identified as an irrigation ditch or canal. Like the stairway, it had two counterparts, equally spaced around the curve of *Rama*.

The three valleys were almost ten kilometers long and stopped abruptly just before they reached the sea—which was strange if they were intended to carry water. And on the other side of the sea the pattern was repeated; three more ten-kilometer trenches continued to the South Polar region.

The men reached the rim of the Straight Valley. The perfectly smooth walls sloped down at an angle of sixty degrees—there were no steps or footholds. Filling the bottom was a sheet of flat, white material that looked very much like ice. A specimen could settle a good many arguments and Norton decided to get one.

With Calvert and Rodrigo acting as anchors and playing out a safety rope, he rapelled slowly down the steep incline. When he reached the bottom he fully expected to find the familiar slippery feel of ice underfoot, but he was mistaken. His footing remained secure. The material was some kind of glass or transparent

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crystal—when he touched it with his fingertips it was cold, hard and unyielding.

Turning his back to the searchlight and shielding his eyes from its glare, Norton tried to peer into the crystalline depths. He could see nothing. The stuff was translucent but not transparent.

He tapped it gently with the hammer from his geology kit—the tool rebounded with a dull, unmusical *clunk*. He tapped harder with no more result and was about to exert his full strength when some impulse made him desist.

It seemed most unlikely that he could crack this material—but what if he did? He would simply be a vandal, smashing something he did not understand. He had already discovered valuable information. It now seemed more unlikely than ever that this was a canal—it was simply a peculiar trench that stopped and started abruptly but led nowhere. If at any time it had carried liquid—where were the stains, the encrustations of dried-up sediment? Everything was bright and clean, as if the builders had left only yesterday.

Once again, he was face to face with the fundamental mystery of *Rama* and now for the first time he had a sense not exactly of foreboding but of anticipation. Things were not what they seemed. There was something odd about a place that was simultaneously new and a million years old.

He began to walk slowly and thoughtfully along the length of the little valley His companions, still holding the rope that was attached to his waist, followed along the rim. He did not expect to make any further discoveries, but he wanted to let his curious emotional state run its course. For something else was worrying him and it had nothing to do with the inexplicable newness of *Rama*.

He had walked no more than a dozen meters when it hit him like a thunderbolt.

He knew this place. He had been here before.

TO RECOGNIZE a spot no human being could possibly have seen was shocking. For several seconds Commander Norton stood glued to the smooth crystalline surface, trying to straighten out his emotions. His well-ordered universe had been turned upside down and he had a dizzying glimpse of those mysteries at the edge of existence which he had successfully ignored for most of his life.

Then, to his immense relief, common sense came to his rescue. The disturbing sensation of *déjà vu* faded, to be replaced by a real and identifiable memory from his youth.

It was true that he had once stood between such steeply sloping walls and watched them drive into the distance until they seemed to converge at a point indefinitely far ahead. But they had been covered with neatly trimmed grass and underfoot had been broken stone, not smooth crystal.

It had happened thirty years ago, during a summer vacation in England. Largely because of

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another student (he could remember her face, but had forgotten her name) he had taken a course in industrial archeology, then very popular among science and engineering graduates. She and he had explored abandoned coal mines and cotton mills, climbed over ruined blast furnaces and steam engines, goggled unbelievingly at primitive (and still dangerous) nuclear reactors and had driven priceless turbine-powered antiques along restored motor roads.

Not everything they had seen had been genuine. Much had been lost during the centuries, for men seldom bother to preserve the commonplace articles of everyday life. But copies had been reconstructed with loving care. And young Norton had found himself bowling along at an exhilarating hundred kilometers an hour while furiously shoveling precious coal into the firebox of a locomotive that had looked two hundred years old, but was actually younger than he was. The thirty-kilometer stretch of the Great Western Railway, however, had been quite genuine, though it had required a good deal of excavating to get it back into commision.

Whistle screaming, the train had plunged into a hillside and raced through a smoky, flame-lit darkness. An astonishingly long time later it had burst out of the tunnel into a deep, perfectly straight cut between steep grassy banks. The long-forgotten vista was almost identical with the one before him now.

"What is it, Skipper?" called Rodrigo. "Have you found something?"

As Norton dragged himself back to present reality some of the oppression lifted from his mind. There was mystery here—yes, but it might not be beyond human understanding. He had learned a lesson, though it was not one that he could readily impart to others. At all costs he must not let *Rama* overwhelm him. That way lay failure—perhaps even madness.

"No," he answered, "there's nothing down here. Haul me up—we'll head straight to Paris."

IX

"I'VE called this meeting of the committee," Dr. Bose said, "because Dr. Perera has something important to tell us. He insists that we get in touch with Commander Norton right away, using the priority channel we've been able to establish after, I might say, a good deal of difficulty. Dr. Perera's statement is rather technical and before we come to it I think a summary of the present position might be in order. Dr. Price has prepared one. Oh, yes—some apologies for absence. Sir Robert is en route to Earth, Professor Solomons is somewhere at the bottom of the Pacific and Dr. Taylor asks to be excused."

He was rather pleased about that last absence. The anthropologist had rapidly lost interest in *Rama* when it became obvious that it would present little scope for him. Like many others he had

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been bitterly disappointed to find that the mobile worldlet was dead—there would be no opportunity for sensational books and viddies about Raman rituals and behavioral patterns. Others might dig up skeletons and classify artifacts—that sort of thing did not appeal to Conrad Taylor. Perhaps the only discovery that would bring him back in a hurry would be some highly explicit works of art—like the notorious frescoes of Thera and Pompei.

Thelma Price, the archeologist, took exactly the opposite point of view. She preferred excavations and ruins uncluttered by inhabitants who might interfere with dispassionate, scientific studies. The bed of the Mediterranean had been ideal—at least until the city planners and landscape artists had started getting in the way. And *Rama* would have been perfect, except for the maddening detail that it was a hundred million kilometers away and she would never be able to visit it in person.

"As you all know," she began, "Commander Norton has completed one traverse of almost thirty kilometers without encountering any problems. He explored the curious trench shown on your maps as the Straight Valley. Its purpose is still unknown, but it's clearly important. It runs the full length of Rama—except for the break at the Cylindrical Sea—and there are two other identical structures a hundred and twenty degrees apart around the circumference.

"Then the party turned left—or east, if we adopt the North Pole convention—until it reached Paris. As you'll see from this photograph, taken by a telescopic camera at the Hub, Paris is a group of several hundred buildings separated by wide streets.

"Now these photographs were taken by Commander Norton's group when they reached the site. If Paris is a city it's a very peculiar one. Note that none of the buildings have windows or even doors. They are all plain, rectangular structures an identical thirty-five meters high. And they appear to have been extruded out of the ground—there are no seams or joints. Look at this closeup of the base of a wall—there's a smooth transition into the ground.

"My own feeling is that this place is not a residential area, but a storage or supply depot. In support of that theory, look at this photo . . .

"These narrow slots or grooves, about five centimeters wide, run along all the streets and there's one leading to every building, going straight into the wall. There's a striking resemblance to the streetcar tracks of the early twentieth century—they are obviously part of some transport system.

"We've never considered it necessary to have public transport connect directly with every house. It would be economically absurd—people can always walk a few hundred meters. But if these buildings were used for the storage of heavy materials, direct access by transportation machinery would make sense."

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"May I ask a question?" From the representative for Earth.

"Of course."

"Commander Norton couldn't get into a single building?"

"No. When you listen to his report, you can tell he was quite frustrated. At one time he decided that the buildings could only be entered from underground. Then he discovered the grooves of the transport system and changed his mind."

"Did he try to break in?"

"There was no way he could—without explosives or heavy tools. And he doesn't want to smash anything until all other approaches have failed."

"I have it!" the representative suddenly interjected. "Cocooning."

"I beg your pardon?"

"It's a technique developed a couple of hundred years ago. Another name for it is mothballing. When you have something you want to preserve you seal it inside a plastic envelope and then pump in an inert gas. The original use was to protect military equipment between wars—it was once applied to whole ships. It's still widely used in museums that are short of storage space. No one knows what's inside some of the hundred-year-old cocoons in the Smithsonian basement."

Patience was not one of Carlisle Perera's virtues—he was aching to drop his bombshell and could restrain himself no longer.

"Please, Mr. Ambassador! This is all very interesting, but I feel my information is rather more urgent."

"If there are no other points—very well, Dr. Perera."

THE exobiologist, unlike Conrad Taylor, had not found *Rama* a disappointment. It was true that he no longer expected to find life—but sooner or later, he had been quite sure, some remains would be discovered of the creatures who had built this fantastic world. The exploration had barely begun, although the time available was horribly brief before *Endeavor* would be forced to escape from her present sun-grazing orbit.

But now, if his calculations were correct, man's contact with *Rama* would be even shorter than he had feared. For one detail had been overlooked because it was so large that no one had noticed it before.

"According to our latest information," Perera began, "one party of explorers is now on its way to the Cylindrical Sea, while Commander Norton has another group setting up a supply base at the foot of Stairway Alpha. When that's established he intends to have at least two exploratory missions operating at all times. In this way he hopes to use his limited manpower at maximum efficiency.

"It's a good plan, but there may be no time to carry it out. In fact, I would advise an immediate alert and a preparation for total withdrawal on twelve hours' notice. Let me explain.

"It's surprising how few people have commented on a rather obvious anomaly about *Rama*.

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The artifact is now well inside the orbit of Venus—yet the interior is still frozen. But the temperature of an object in direct sunlight at this point is about five hundred degrees.

"The reason for the cold interior is, of course, that *Rama* hasn't had time to warm up. It must have cooled down to near absolute zero—two hundred seventy below—while it was in interstellar space. Now its outer hull is already almost as hot as molten lead. There's some kind of fancy dessert with a hot exterior and ice cream in the middle—I don't remember what it's called—"

"Baked Alaska. It's a favorite at U.P. banquets, unfortunately."

"Thank you. That's the situation in *Rama* at the moment, but it won't last. All these weeks the solar heat has been working its way through and we expect a sharp temperature rise to begin in a few hours. That's not the problem—by the time Commander Norton will have to leave the air will be no more than comfortably tropical."

"Then what's the difficulty?"

"I can answer in one word, Mr. Ambassador. Hurricanes."

THERE were now more than twenty men and women inside *Rama*—six of them down on the plain, the rest ferrying equipment and expendables through the airlock system and down the stairway. The ship itself was almost deserted, with the minimum possible staff on duty. The joke went around that *Endeavor* was really being run by the four simps and that Goldie had been given the rank of acting commander.

For these first explorations Norton had established a number of ground rules. The most important dated back to the earliest days of man's spacefaring. Every group, he had decided, must contain one person with prior experience. But no more than one. In that way everybody would have an opportunity of learning as quickly as possible and substitutes would be available for possible future emergencies.

The first party to head for the Cylindrical Sea, led by Surgeon-Commander Laura Ernst, had as its one-time veteran Boris Rodrigo, just back from Paris. The third member, Sergeant Pieter Rousseau, had been with the backup teams at the Hub—he was an expert on space reconnaissance instrumentation, but on this trip he would have to depend on his own eyes and a small portable telescope.

From the foot of Stairway Alpha to the edge of the sea was just under fifteen kilometers. Laura Ernst set a brisk pace. She stopped her team for thirty minutes at the midway mark and made the whole trip in a completely uneventful three hours.

Walking in the beam of the searchlight through the anechoic darkness of *Rama* was also quite monotonous. As the pool of light advanced with the explorers it slowly elongated into a long, narrow ellipse—this foreshortening of the beam was the only visi-

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ble sign of progress. If the observers on the Hub had not given them continual distance checks, they could not have guessed whether they had traveled one kilometer or five or ten. They simply plodded through the million-year-old night over an apparently seamless metal surface.

But at last, far ahead at the limits of the weakening beam they saw something new. On a normal world it would have been a horizon.

They were nearing the edge of the sea.

"Only a hundred meters," said Hub Control. "Better slow down."

They had already done so. From the level of the plain to the sea was a sheer straight drop of fifty meters. Although Norton had impressed upon everyone the danger of taking anything for granted in *Rama,* few doubted that the sea was really made of ice. But for what conceivable reason was the cliff on the southern shore five hundred meters high, instead of the fifty here?

IT WAS as if they were approaching the edge of the world—their oval of light, cut off abruptly ahead of them, became shorter and shorter. But far out on the curved screen of the sea their monstrous foreshortened shadows appeared in magnified and exaggerated movement. Those shadows had been their companions every step of the way, but now that they were broken at the edge of the cluff they no longer seemed part of the humans who cast them. They might have been creatures of the Cylindrical Sea, waiting to deal with any intruders into their domain.

From the edge of the fifty-meter cliff it was possible to appreciate fully the curvature of *Rama.* But no one had ever before seen a frozen lake bent upward into a cylindrical surface—the image was distinctly unsettling and the eye did its best to find some other interpretation. It seemed to Dr. Ernst, who had once made a study of visual illusions, that half the time she was really looking at a horizontally curving bay, not a surface that soared up into the sky. It required a deliberate effort of will to accept the fantastic truth.

Only in the line directly ahead, parallel to the axis of *Rama,* was normalcy preserved. In this direction alone was there agreement between vision and logic. Here—for the next few kilometers at least—*Rama* looked flat and was flat. And out there, beyond their distorted shadows and the outer limit of the beam, lay the island that dominated the Cylindrical Sea.

"Hub Control," Dr. Ernst radioed. "Please aim your beam at New York."

The night of Rama fell suddenly upon the team as the oval of light went sliding out to sea. Conscious of the now invisible cliff at their feet, they all stepped back—and then, as if by magic, the towers of New York sprang into view.

The resemblance to old-time Manhattan was only super-

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ficial—this star-born echo of Earth's past possessed its own unique identity. The more Dr. Ernst stared at it, the more certain she became that it was not a city at all.

The real New York, like all of man's habitations, had never been finished—still less had it been designed. This place, however, had an overall symmetry and pattern, though one so complex that it eluded the mind. It had been conceived and planned by some controlling intelligence—and then it had been completed, like a machine devised for some specific purpose. After that there was no possibility of growth or change.

The beam of the searchlight slowly tracked along those distant towers and domes, interlocked spheres and criss-crossed tubes. Sometimes there would be a brilliant reflection as some flat surface shot the light back toward the viewers. The first time this happened they were taken by surprise. It was exactly as if someone on that strange island were signaling to them.

But they could see nothing here that was not already shown in greater detail on photographs taken from the Hub. After a few minutes they called for the light to return to them and began to walk east along the edge of the cliff. It was plausibly theorized that somewhere there had to be a flight of steps or a ramp leading down to the sea. And a sailor among the crewmen raised an interesting conjecture.

"Where there's a sea," Sergeant Ruby Barns predicted, "there must be docks and harbors—and ships. You can learn everything about a culture by studying the way it builds boats." Her colleagues thought this a rather restricted point of view, but at least it was a stimulating one.

DR. ERNST had almost given up the search and was preparing to make a descent by rope when Rodrigo spotted the narrow stairway. It could easily have been overlooked in the shadowed darkness below the edge of the cliff, for there was no guard rail or other indication of its presence. And it seemed to lead nowhere—it ran down the vertical wall at a steep angle and disappeared below the surface of the sea.

They scanned the flight of steps with their helmet lights, could see no conceivable hazard, and Dr. Ernst got Commander Norton's permission to descend. A minute later she was cautiously testing the surface of the sea.

Her foot slithered almost frictionlessly back and forth. The material felt exactly like ice. It *was* ice.

When she struck it with her hammer, a familiar pattern of cracks radiated from the impact point and she had no difficulty collecting as many pieces as she wished. Some had already melted when she held the sample holder to the light—the liquid appeared to be slightly turbid water. She took a cautious sniff.

"Is that safe?" Rodrigo called down with a trace of anxiety.

"Believe me, Boris," she an-

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swered, "if there are any pathogens around here that have slipped through my detectors our insurance policies lapsed a week ago."

But Boris, she knew, had a point. Despite all the tests that had been carried out there was a risk that the substance might be poisonous or might carry some unknown disease. In normal circumstances Dr. Ernst would not have taken the chance. Now, however, time was short and the stakes were enormous. If it became necessary to quarantine *Endeavor* the price would be a small one to pay for her cargo of knowledge.

"It's water, but I wouldn't care to drink it. It smells like an algae culture that's gone bad. I can hardly wait to get it to the lab."

"Is the ice safe to walk on?"

"Yes, solid as a rock."

"Then we can get to New York."

"Can we? Have you ever tried to walk across four kilometers of ice?"

"I see what you mean. And there's another problem—the temperature is already above freezing. Before long that ice is going to melt. How many spacemen can swim four kilometers?"

Dr. Ernst held up her small sample bottle in triumph.

"It's a long walk for a few cc's of dirty water, but this may teach us more about *Rama* than anything we've found so far. Let's head for home."

They turned toward the distant lights of the Hub. Often they looked back, drawn by the hidden enigma of the island out there in the center of the frozen sea.

Just once Dr. Ernst thought she felt the faintest suspicion of a breeze against her cheek.

It did not come again and she quickly forgot all about it.

X

"AS YOU know perfectly well, Dr. Perera," said Dr. Bose in tone of patient resignation, "few of us share your knowledge of mathematical meteorology. So please take pity on our ignorance."

"With pleasure." Perera was unabashed. "I can explain it best by telling you what is going to happen inside *Rama* very soon. The solar heat pulse has reached the interior and the temperature is on the rise. According to my latest information it's already above freezing point. The Cylindrical Sea will soon start to thaw and, unlike bodies of water on Earth, it will melt from the bottom up. That may produce some odd effects, but I'm much more concerned with the atmosphere.

"As it is heated the air inside *Rama* will expand—and will attempt to rise toward the central axis. And this is the problem. At ground level, although it's apparently stationary, it's actually sharing the spin of Rama—over eight hundred kilometers an hour. As it rises toward the axis it will try to retain that speed—and it won't be able to do so, of course. The result will be violent winds and turbulence—I estimate velocities of between two and three hundred kilometers an hour.

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"Incidentally, very much the same thing occurs on Earth. The heated air at the equator—which shares the Earth's spin—runs into the same problem when it rises and flows north and south."

"Ah, the trade winds. I remember them from my geography lessons."

"Exactly. Rama will have Trade Winds—with a vengeance. I believe they'll last only a few hours and then some kind of equilibrium will be restored. Meanwhile, I should advise Commander Norton to evacuate as soon as possible. Here is the message I propose sending . . ."

WITH a little imagination, Commander Norton told himself, he could pretend that he was night-camping at the foot of some mountain in a remote region of Asia or America. The clutter of sleeping pads, collapsible chairs and tables, portable power plant, lighting equipment, electrosan toilets and miscellaneous scientific apparatus would not have looked out of place on an Earth expedition—especially as the men and women around him were without life-support systems.

Establishing Camp Alpha had been hard work. Everything had had to be manhandled through the chain of airlocks, sledded down the slope from the Hub and then retrieved and unpacked. Sometimes, when the braking parachutes had failed, a consignment had ended up a good kilometer away out on the plain.

Almost all this equipment would stay here, for the labor of carrying it back was unthinkable—in fact, impossible. Norton felt an irrational shame at leaving so much human litter in this strangely immaculate place—but in the meantime he had a more immediate problem. During the last twenty-four hours he had received almost identical messages from both Mars and Earth. It seemed an odd coincidence—had his two wives been commiserating with each other? Rather pointedly each had reminded him that even great heroes had family responsibilities.

The commander picked up a collapsible chair and walked out of the pool of light into the darkness surrounding the camp. It was the only way he could get privacy. Deliberately turning his back on the organized confusion behind him, he began to speak into the recorder slung around his neck.

"Original for personal file, dupes to Mars and Earth. Hello darling—yes, I know I've been a lousy correspondent, but I haven't been aboard ship for a week. Apart from a skeleton crew, we're all camping inside *Rama*, at the foot of the stairway we've christened Alpha.

"I have three parties scouting the plain, but we've made disappointingly slow progress. Everything has to be done on foot. I'd happily settle for a few electric bicycles.

"You've met my medical officer, Dr. Ernst—"

He paused uncertainly. Laura had met one of his wives, but which one?

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Erasing the sentence, he began again.

"My medical officer, Dr. Ernst, led the first group to reach the Cylindrical Sea, fifteen kilometers from here. She found frozen water as we had expected—but you wouldn't want to drink it. Dr. Ernst says it's a dilute organic soup, containing traces of almost any carbon compound you might care to name, as well as phosphates and nitrates and dozens of metallic salts. There's not the slightest sign of life—not even any dead micro-organisms. So we still know nothing about the biochemistry of the Ramans—though it was probably not wildly different from ours."

Something brushed lightly against his hair. He had been too busy to get it cut and would have to do something about that before he next put on a space helmet . . .

"You've seen the viddies of Paris and the other towns we've explored on this side of the sea—London, Rome, Moscow. It's impossible to believe that they were ever built for anything or anyone to live in. Paris looks like a giant storage depot. London is a collection of cylinders linked together by pipes connected to what are obviously pumping stations. Everything is sealed up and there's no way of finding what's inside without explosives or lasers. We won't try these until there are no alternatives.

"As for Rome and Moscow—"

"Excuse me, skipper. Priority from Earth."

What now? Norton asked himself. *Can't a man get a few minutes to talk to his families?*

HE TOOK the message from the sergeant and scanned it quickly to satisfy himself that it was not urgent. Then he read it again more slowly.

What the devil was the *Rama* Committee? And why had he never heard of it? He knew that all sorts of associations, societies and professional groups—some serious, some completely crackpot—had been trying to get in touch with him.

Two-hundred-kilometer winds—probably sudden onset—well they were something to think about. But it was hard to take them too seriously on this utterly calm night and it would be ridiculous for his people to run away like frightened mice when they were just starting effective exploration.

Commander Norton lifted a hand to brush aside his hair, which had somehow fallen into his eyes again. Then he froze, the gesture uncompleted.

He had felt a trace of wind several times in the last hour. It was so slight that he had completely ignored it—after all, he was the commander of a spaceship, not a sailing vessel. Until now the movement of air had not been of any conceivable professional concern. What would the long-dead captain of that earlier *Endeavor* have done in a situation such as this?

Norton had often asked himself that question at moments of crisis. *Endeavor* had been named after one of the most famous

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ships in history. During the last four hundred years there had been a dozen *Endeavors* of sea and two of space, but the ancestor of them all was the 370-ton Whitby collier that Captain James Cook, R.N. had sailed around the world between 1768 and 1771.

With an absorbing curiosity—almost an obsession—Norton had read everything he could find about Cook. Cook had been not only a supreme navigator but a scientist and—in an age of brutal discipline—a humanitarian. At times like this Cook's reassuring presence seemed very close.

The sergeant waited patiently while his commander stared silently out into the night of *Rama*. It was no longer unbroken, for at two spots about four kilometers away the faint patches of light of exploring parties could be clearly seen.

In an emergency, I can recall them within the hour, Norton told himself. *And that surely should be good enough . . .*

He turned to the sergeant. "Take this message. *Rama* Committee, care of Spacecom. Appreciate your advice and will take precautions. Please specify meaning of phrase 'sudden onset.' Respectfully, Norton, Commander, *Endeavor.*"

He waited until the sergeant had disappeared toward the blazing lights of the camp, then switched on his recorder again. But the train of thought was broken and he could not get back into the mood. The letter would have to wait for some other time.

It was not often that Captain Cook came to his aid when Norton was neglecting his duty. But he suddenly remembered how rarely and briefly poor Elizabeth Cook had seen her husband in sixteen years of married life. Yet she had borne him six children—and had outlived them all.

Norton's wives, never more than ten minutes away at the speed of light, had nothing to complain about.

XI

DURING the first "nights" on *Rama* it had not been easy to sleep. The darkness and the mysteries it concealed were oppressive, but even more unsettling was the silence. Absence of noise is not a natural condition—all human senses require some input. If they are deprived of it the mind manufactures its own substitutes.

Many in *Endeavor's* crew had complained of strange sounds—even of voices—which were obviously illusions, because instruments had recorded nothing. Dr. Ernst had finally prescribed a simple cure—during sleeping periods the camp was now lulled by gentle, unobtrusive background music.

Tonight Commander Norton found the cure inadequate. He kept straining his ears into the darkness and he knew what he was listening for. But though a very faint breeze did caress his face from time to time, there was no sound that could possibly be taken for that of a distant, rising wind. Nor did either of the exploring parties report anything unusual.

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At last, around ship's midnight, he fell asleep. There was always a man on watch at the communications console, in case of any urgent messages. No other precautions seemed necessary.

Not even a hurricane could have created the sound that did wake him—and the whole camp—in a single instant. It seemed that the sky was falling—or that *Rama* had split open and was tearing itself apart. First came a rending crack, then a long drawn-out series of crystalline crashes like a million glass houses being demolished. It lasted for minutes—it was still continuing, apparently moving away into the distance, when Norton got to the message center.

"Hub Control. What's happened?"

"Just a moment, skipper. It's over by the sea. We're getting the light on it."

The searchlight began to swing its beam out across the plain. It reached the edge of the sea, then started to track along it, scanning around the interior of the world. It stopped a quarter of the way around the cylindrical surface.

Up in the sky—or what the mind still persisted in calling the sky—something extraordinary was happening. At first it seemed to Norton that the sea was boiling. It was no longer static and frozen in the grip of an eternal winter. A huge area, kilometers across, was in turbulent movement. And it was changing color—a broad band of white was marching across the ice.

Suddenly a slab perhaps a quarter of a kilometer on a side began to tilt upward like an opening door. Slowly and majestically it reared into the sky, glittering and sparkling in the beam of the searchlight. Then it slid back and vanished beneath the surface, while a tidal wave of foaming water raced outward in all directions from its point of submergence.

Not until then did Norton fully realize what was happening. The ice was breaking up. All these days and weeks the sea had been thawing far down in its depths. It was hard to concentrate because of the crashing roar that still filled the world and echoed around the sky, but he tried to think of a reason for so dramatic a convulsion. When a frozen lake or river thawed on Earth it was nothing like this.

BUT the explanation became obvious enough after the fact. The sea was thawing from beneath as the solar heat seeped through the hull of *Rama*. When ice turns into water it occupies less volume, so the sea had been sinking below the upper layer of ice, leaving it unsupported. The strain had been building up day by day and now the band of ice that circled the equator of *Rama* was collapsing like a bridge that had lost its central supports. It was splintering into hundreds of floating islands that would crash and jostle into each other until they, too, melted. Norton's blood ran suddenly cold when he remembered the plans that were being made to reach New York by sledge.

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The tumult was subsiding. A temporary stalemate had been reached in the war between ice and water. In a few hours, as the temperature continued to rise, the water would win and the last vestiges of ice would disappear. But in the long run ice would be the victor as *Rama* rounded the sun and set forth once more into the interstellar night.

Norton remembered to start breathing again. Then he called the party nearest the sea. To his relief, Lieutenant Rodrigo answered at once. No, the water hadn't reached them. No tidal wave had come sloshing over the edge of the cliff.

"So now we know," he added calmly, "why there is a cliff."

Norton agreed silently, his mind briefly groping for reasons why the cliff on the southern shore was ten times higher—and unable to settle on one.

The Hub searchlight continued to scan around the world. The awakened sea was steadily calming and the boiling white foam no longer raced outward from capsizing ice floes. In fifteen more minutes the main disturbance was over.

But *Rama* was no longer silent. It had awakened from its sleep and over and again there came the sound of grinding ice as one berg collided with another.

Spring had been a little late, Norton told himself, but winter had ended.

And there was that breeze again, stronger than ever. *Rama* had given him enough warnings. It was time to go.

AS HE neared the halfway mark Norton once again felt gratitude to the darkness that concealed the view above—and below. Though he knew that more than ten thousand steps still lay ahead of him and could picture the steeply ascending curve in his mind's eye, the fact that he could see only a small portion of it made the prospect more bearable.

This was his second ascent and he had learned from his mistakes on the first. The great temptation was to climb too quickly in this low gravity—it was hard to adopt a slow, plodding rhythm. But unless one did this muscles that one never knew existed started to protest, and it was necessary to take longer and longer periods of rest for them to recover.

This time he had started with almost painful slowness, moving like an old man. He had been the last to leave the plain and the others were strung out along the half-kilometer of stairway above him—he could see their lights moving up the invisible slope ahead.

He felt sick at heart at the failure of his mission and even now hoped that this retreat was only temporary. When they reached the Hub, they could wait until any atmospheric disturbances had ceased. Presumably a dead calm would reign there, as at the center of a cyclone, and they could wait out the expected storm in safety.

He realized he was jumping to conclusions, drawing possibly dangerous analogies from Earth. The meteorology of a whole world, even under steady-state conditions, was a matter of enor-

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mous complexity. After several centuries of study, terrestrial weather forecasting was still not reliable. And *Rama* was not merely a completely novel system—it was undergoing rapid changes. The temperature had risen several degrees in the last few hours. Still there was no sign of the promised hurricane, though a few feeble gusts had come from apparently random directions.

They had climbed five kilometers when, at the third level, three kilometers from the axis, they paused to rest for an hour, taking light refreshments and massaging leg muscles. This was the last point at which they could breathe in comfort. They had left their oxygen supplies here and now put them on for the final ascent.

An hour later they had reached the top of the stairway—and the beginning of the ladder. Ahead lay the last vertical kilometer, fortunately in a gravity field only a few per cent of Earth's. Another thirty-minute rest, a careful check of oxygen and they were ready for the final lap.

Once again Norton made sure that all his men were safely ahead of him, spaced out at twenty-meter intervals along the ladder. From now on it would be a slow, steady haul, extremely boring. The best technique was to empty the mind of all thoughts and to count the rungs as they drifted by—one hundred, two hundred, three hundred, four hundred...

He had reached twelve hundred and fifty when he suddenly realized that something was wrong. The light shining on the vertical surface immediately before his eyes was the wrong color—and it was much too bright.

Norton did not have time to check his ascent or to call a warning to his men. Everything happened in less than a second.

In a soundless concussion of

dawn burst upon Rama.

THE light was so brilliant that for a full minute Norton had to keep his eyes tightly shut. When he risked opening them he had to blink and wait for involuntary tears to drain away before he turned slowly to behold the dawn.

He could endure the sight for only a few seconds before he was forced to close his eyes again. It was not the glare that was intolerable—but the awesome spectacle of *Rama*, now viewable for the first time in its entirety.

Norton had known exactly what to expect—nevertheless the sight was at once stunning and disorienting. He was seized by a spasm of uncontrollable trembling. His hands tightened around the rungs of the ladder. His legs felt ready to give. Except for the low gravity he might have fallen.

Then his training took over and he began to apply the first remedy for panic. Keeping his eyes shut and trying to forget the monstrous spectacle around him, he started to take deep, long breaths. Presently he felt much better, but he did not open his eyes until he had performed one more action. It took a major effort of will to force his right hand to open—he had to talk to it as to a disobedient child—but presently he maneu-

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vered it down to his waist, unclipped the safety belt from his harness and hooked the buckle to the nearest rung. Now, whatever happened, he could not fall.

Norton switched on his radio. He hoped his voice sounded calm and authoritative as he said, "The captain speaking. Is everyone okay?"

As he called out and checked off the names one by one his confidence and control returned.

"Keep your eyes shut until you're quite sure you can stand it—the view is overwhelming. Anyone who finds it's too much—continue climbing without looking back. Keep in mind that you'll soon be at zero gravity, where falling is impossible."

The thought of zero gravity was a kind of talisman now.

It became an urgent matter of pride and self-esteem for Norton to open his eyes once more and look at the world around him. He let go of the ladder with both hands and hooked his left arm under a rung. Clenching and unclenching his fists, he waited until the muscle cramps had vanished. When he felt quite comfortable he turned to face *Rama*.

His first impression was one of blueness. The glare that filled the sky could not have been mistaken for sunlight—it might have been that of an electric arc. He suddenly understood the purpose of those mysterious trenches—Straight Valley and its companions were gigantic light strips. Rama had six linear suns, symmetrically arranged around its interior. A broad fan of light was aimed from each, across the central axis to shine on the far side of the world. Norton wondered if the lights could be switched alternately to produce a cycle of day and darkness—or was *Rama*, awakened, a world of perpetual day?

TOO much staring at those blinding bars of light had made his eyes hurt again—he was not sorry to have a good excuse to close them for a while. It was not until he had recovered from the initial visual shock that he was able to devote himself to a much more serious problem.

Who—or what—had switched on the lights of Rama?

This world was sterile by the most sensitive tests that man could apply to it. But now something was happening that could not be explained by the action of natural forces. There might not be life here, but there could be consciousness, awareness—robots might be waking after a sleep of eons. Perhaps this outburst of light was an unprogramed, random spasm—a last dying gasp of machines that were responding wildly to the warmth of a new sun and would soon lapse again into quiescence, this time forever.

Yet Norton could not believe such a simple explanation. Bits of the puzzle were beginning to fall into place, though many items were still missing. The absence of all signs of wear and the feeling of newness, the sense that *Rama* had just been created, remained unexplained.

He began a careful inventory of everything he saw.

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First he had to establish some kind of reference system. He was looking at the largest enclosed space ever seen by man and needed a mental map to find his way around it. The feeble gravity was little help—with an effort of will he could switch up and down in any direction he pleased. But some directions were psychologically dangerous. Whenever his mind skirted these he had to vector it away hastily.

Safest of all was to imagine that he was at the bowl-shaped bottom of a gigantic well, sixteen kilometers wide and fifty deep. The advantage of this image was that there could be no danger of his falling farther. Nevertheless, it had some serious defects.

He could pretend that the scattered towns and cities and the differently colored and textured areas were all securely fixed to the towering walls. The various complex structures that could be seen hanging from the dome overhead need be no more disconcerting than the pendent chandelier in some great concert hall on Earth. What was quite unacceptable was the Cylindrical Sea.

There it was, halfway up the wellshaft—a band of water wrapped completely around it and with no visible means of support. It was a vivid blue, flecked with brilliant sparkles from the few remaining ice floes. But a vertical sea forming a complete circle twenty kilometers in the sky was such an unsettling phenomenon that after a while he began to seek an alternative.

That was when his mind switched the scene through ninety degrees. Instantly the deep well became a long tunnel, capped at either end. "Down" was obviously in the direction of the ladder and stairway he had just ascended. And from this perspective Norton was at last able to appreciate the true vision of the architects who had built this place.

HE WAS clinging to the face of a curving, high cliff, the upper half of which overhung completely until it merged into the arched roof of what was now the sky. Beneath him the ladder descended more than five hundred meters until it ended at the first ledge or terrace. From there the stairway continued almost vertically through its low-gravity regime, slowly becoming less and less steep until, after breaking at five more platforms, it reached the distant plain. For the first two or three kilometers the individual steps were visible. Thereafter they merged into a continuous band.

The downward swoop of that immense stairway was so overwhelming that it was impossible to appreciate its true scale. Norton had once flown around Mount Everest. He reminded himself that this stairway was as high as the Himalayas, but found the comparison meaningless.

And no comparison at all was possible with the other two stairways, Beta and Gamma, which slanted up into the sky and then curved far out over his head. Norton had now acquired enough confidence to lean back and glance up at them—briefly.

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Then he tried to forget that they were there.

Too much thinking along those lines evoked yet a third image of *Rama,* one he was anxious to avoid at all costs. It regarded *Rama* as a vertical cylinder, but now he was at the top, with a fifty-kilometer drop immediately below. Every time Norton found this image creeping up on him he needed all his willpower to keep from clinging to the ladder again in mindless panic.

In time, he was sure, all these fears would ebb. The wonder and strangeness of *Rama* would banish its terrors for men trained to face the realities of space.

He looked at his chronometer. His pause for orientation had lasted only minutes, but had seemed a lifetime. Exerting barely enough effort to overcome his inertia and the fading gravitational field, he started to pull himself slowly up the last hundred meters of the ladder. Just before he entered the airlock and turned his back upon *Rama* he decided to make one final swift survey of the interior.

It had changed even in the last few minutes. A mist was rising from the sea. For the first few hundred meters the ghostly white columns were tilted sharply forward in the direction of *Rama's* spin. Then they started to dissolve in a swirl of turbulence as the upRushing air tried to jettison its excess velocity. The trade winds of this cylindrical world were beginning to etch their patterns in its sky—the first tropical storm in unknown ages was about to break.

XII

FOR the first time in weeks every member of the *Rama* Committee had made himself available. Professor Solomons had emerged from the depths of the Pacific, where he had been studying mining operations along mid-ocean trenches. And, to nobody's surprise, Dr. Taylor had reappeared now that there was at least a possibility that *Rama* held something more newsworthy than lifeless artifacts.

The chairman had fully expected Dr. Carlisle Perera to be even more dogmatically assertive than usual now that his prediction of a hurricane in *Rama* had been confirmed. To Dr. Bose's great surprise, Perera was remarkably subdued and accepted the congratulations of his colleagues in a manner as close to embarrassed modesty as he was ever likely to achieve.

The exobiologist was, in fact, deeply mortified. The spectacular breakup of the Cylindrical Sea's ice was a much more obvious phenomenon than the hurricane winds—yet he had completely overlooked it. To have remembered that hot air rises, but to have forgotten that hot ice contracts, was not an achievement of which he could be proud.

When the chairman offered him the floor and asked what further climatic changes he expected Perera was careful this time to hedge his bets.

"You must realize," he explained, "that the meteorology of

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a world as strange as *Rama* may have many other surprises. But if my calculations are correct there will be no further storms and conditions will soon be stable. There will be a slow temperature rise until perihelion—and beyond—but that won't concern us. *Endeavor* will have had to leave long before then."

"So it should soon be safe to go back inside?"

"Probably. We should certainly know in forty-eight hours."

"A return is imperative," said the member from Mercury. "We have to learn everything we possibly can about *Rama*. The situation has now changed completely."

"I think we know what you mean, but would you care to elaborate?"

"Of course. Until now we have assumed that *Rama* is lifeless, or at any rate uncontrolled. But we can no longer pretend that it is a derelict. It may be directed by robot mechanisms programed to carry out some mission—perhaps one highly disadvantageous to us. Unpalatable though it may be, we must consider the question of self-defense."

A babble of protesting voices rose and Dr. Bose had to hold up his hand to restore order.

"Whether we like the idea or not, the suggestion should be considered seriously," he called out.

"With all due respect," said Dr. Conrad Taylor in his most disrespectful voice, "I think we can rule out as naive the fear of malevolent intervention. Creatures as advanced as the Ramans must have correspondingly developed morals. Otherwise they would have destroyed themselves—as we nearly did in the twentieth century. I've made that quite clear in my new book *Ethos and Cosmos*. I hope you received your copy."

"Yes, thank you, though I'm afraid the pressure of other matters has not allowed me to read beyond the introduction. However, I'm familiar with the general thesis. We may have no malevolent intentions toward an ant colony. But if we want to build a house on the site occupied by one—"

"This is as bad as the Pandora Party! It's nothing less than interstellar xenophobia—"

"Please, gentlemen! This is getting us nowhere. Mr. Ambassador, you still have the floor."

THE chairman glared across three hundred and eighty thousand kilometers of space at Conrad Taylor, who reluctantly subsided.

"Thank you," said the member from Mercury. "The danger may be unlikely, but where the future of the human race is involved we can take no chances. And we Hermians are particularly concerned. We may have more cause for alarm than anyone else."

"Why Mercury, more than any other planet?" asked the chairman.

"Look at the dynamics of the situation. *Rama* is already inside our orbit. It is only an assumption that it will go around the sun and head out again into space. Suppose it carries out a braking

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maneuver. If it does so, this will occur at perihelion, about thirty days from now. My scientists tell me that if the entire velocity change is carried out there *Rama* will end up in a circular orbit only twenty-five million kilometers from the sun. From there it could dominate the solar system."

For a long time nobody—not even Conrad Taylor—spoke a word. All the members of the committee were marshaling their thoughts about those difficult people, the Hermians.

To most people Mercury was a fairly good approximation of hell—at least it would do until something worse came along. But the Hermians were proud of their bizarre planet, of its days longer than its years, its double sunrises and sunsets and its rivers of molten metal. By comparison the moon and Mars had been almost trivial challenges. Not until men landed on Venus (if they ever did) would they encounter an environment more hostile than that of Mercury.

And yet this world had turned out to be in many ways the key to the solar system. The reasons for this seemed obvious in retrospect, but the space age had been almost a century old before the fact was realized. Now the Hermians never let anyone forget it.

Long before men reached the planet, Mercury's abnormal density hinted at the heavy elements it contained—even so, its wealth was still a source of astonishment and had postponed for a thousand years any fears that the key metals of human civilization would be exhausted. And these treasures were in the best possible place—where the power of the sun was ten times greater than on frigid Earth.

Unlimited energy and unlimited metal—that was Mercury. Its great magnetic launchers could catapult manufactured products to any point in the solar system. It could also export energy in synthetic transuranium isotopes or pure radiation. It had even been proposed that Hermian lasers would one day thaw out gigantic Jupiter, but this idea had not been well received on the other worlds. A technology that could cook Jupiter had too many tempting possibilities for interplanetary blackmail.

That such a concern had ever been expressed said a good deal about the general attitude toward the Hermians. They were respected for their toughness and engineering skills and admired for the way in which they had conquered so fearsome a world. But they were not liked—and still less were they completely trusted.

At the same time it was possible to appreciate their point of view. The Hermians, it was often joked, sometimes behaved as if the sun were their personal property. They were bound to it in an intimate love-hate relationship—as the Vikings had once been linked to the sea, the Nepalese to the Himalayas, the Eskimos to the tundra. They would be most unhappy if something came between them and the natural force that dominated and controlled their lives.

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AT LAST the chairman broke the long silence. He took the Hermians very seriously indeed, even though he considered them uncouth technological barbarians.

"I think there is some merit in your argument, Mr. Ambassador," he said slowly. "Have you any proposals?"

"Yes, sir. Before we know what action to take we must have the facts. We know the geography of *Rama*—if one can use that term—but we have no idea of its capabilities. And the key to the whole problem is this: does *Rama* have a propulsion system? Can it change orbit? I'd be very interested in Dr. Perera's views."

"I've given the subject a good deal of thought," answered the exobiologist. "*Rama* must have been given its original impetus by some launching device, but that could have been an external booster. If it does have onboard propulsion we've found no trace of it. Certainly there are no rocket exhausts—or anything similar—anywhere on the outer shell."

"They could be hidden."

"True, but there would seem little point in anyone's having done so. And where are the propellant tanks, the energy sources? The main hull is solid—we've checked that with seismic surveys. The cavities in the northern cap are all accounted for by airlock systems.

"That leaves the southern end of *Rama*, which Commander Norton has been unable to reach owing to that wide band of water. There are all sorts of curious mechanisms and structures on the South Pole—you've seen the photographs. What they are is anybody's guess.

"But I'm reasonably sure of this. If *Rama* does have a propulsion system it's something completely outside our present knowledge. In fact, it would have to be the fabulous 'space drive' people have been talking about for two hundred years."

"You wouldn't rule that out?"

"Certainly not. If we can prove that *Rama* has a space drive—even if we learn nothing about its mode of operation—that would be a major discovery. At least we'd know that such a thing is possible."

"What is a space drive?" asked Sir Robert.

"Any kind of propulsion system, Sir Robert, that doesn't work on the rocket principle. Anti-gravity—if it is possible—would do very nicely. At present we don't know where to look for such a drive and most scientists doubt it exists."

"It doesn't," Professor Davidson interjected. "Newton settled that. You can't have action without reaction. Space drives are nonsense. Take it from me."

"You may be right," Perera replied with unusual blandness. "But if *Rama* doesn't have a space drive it has no drive at all. There's simply no room for a conventional propulsion system, with its enormous fuel tanks."

"It's hard to imagine a whole world being pushed around," said Dennis Solomons. "What would happen to the objects inside it?

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Everything would have to be bolted down. Most inconvenient."

"Well, the acceleration would probably be very low. The biggest problem would be the water in the Cylindrical Sea. How would you stop that from. . ."

PERERA'S voice suddenly faded away and his eyes glazed over. He seemed to be in the throes of an incipient epileptic fit or even a heart attack. His colleagues looked at him in alarm.

He made a sudden recovery, banged his fist on the table and shouted, "Of course! That explains everything. The southern cliff—now it makes sense!"

"Not to me," grumbled the Lunar representative.

"Look at this longitudinal cross-section of *Rama*," Perera continued excitedly, unfolding his map. "Have you got your copies? The Cylindrical Sea is enclosed between two cliffs, which completely circle the interior of *Rama*. The one on the north is only fifty meters high. The southern one, on the other hand, is almost half a kilometer high. Why the big difference? No one's been able to think of a sensible reason.

"But suppose *Rama* is able to propel itself—accelerate so that the northern end is forward. The water in the sea would tend to move back—the level at the south would rise perhaps hundreds of meters. Hence the cliff. Let's see—"

Perera started scribbling furiously. After an astonishingly short time he looked up in triumph.

"Knowing the height of those cliffs we can calculate the maximum acceleration *Rama* can take. If it were more than two per cent of a gravity the sea would slosh over into the southern continent."

"A fiftieth of a gee? That's not very much."

"It is—for a mass of ten million megatons. And it's all you need for astronomical maneuvering."

"Thank you very much, Dr. Perera," the Hermian said. "You've given us a lot to think about. Mr. Chairman—can we impress on Commander Norton the importance of looking at the South Polar region?"

"He's doing his best. The sea is the obstacle, of course. They're trying to build some kind of raft so that they can at least reach New York."

"The South Pole may be even more important. Meanwhile, I am going to bring these matters to the attention of the general assembly. Do I have your approval?"

There were no objections, not even from Dr. Taylor. But just as the committee members were about to switch out of circuit, Sir Lewis raised his hand.

The old historian seldom spoke. When he did, everyone listened.

"Suppose we do find that *Rama* is active and has these capabilities. There is an old saying in the military that capability does not imply intention."

"How long should we wait to find what *Rama's* intentions are?" asked the Hermian. "When we discover them it may be too late."

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"It is already too late. There is nothing we can do to affect *Rama*. Indeed, I doubt if there ever was."

"I do not admit that, Sir Lewis. There are many things we can do—if it proves necessary. But the time is desperately short. *Rama* is a cosmic egg being warmed by the fires of the sun. It may hatch at any moment."

The chairman of the committee looked at the ambassador for Mercury in frank astonishment. He had seldom been so surprised in his diplomatic career.

He would never have dreamed a Hermian capable of such a poetic flight of imagination.

XIII

WHEN one of his crew called him "Commander" or, worse still, "Mr. Norton" something serious was afoot. Norton could not recall that Boris Rodrigo had ever before addressed him in such a fashion. So whatever was on Rodrigo's mind, obviously the man considered it to be of the gravest importance.

"What's the problem, Boris?"

"I'd like permission, Commander, to use ship priority for a direct message to Earth."

The request was unusual, though not unprecedented. Routine signals went to the nearest planetary relay—at the moment they were working through Mercury—and even though the transit time was only a matter of minutes, it was often five or six hours before a message arrived at the desk of the person for whom it was intended. Ninety-nine per cent of the time that was quite good enough. In an emergency more direct—and much more expensive—channels could be employed at the captain's discretion.

"You know, of course, that you have to give me a good reason. All our available bandwidth is already clogged with data transmissions. Is this a personal emergency?"

"No, Commander. It's much more important. I want to send a message to the Mother Church."

"I'd be glad if you'll explain."

It was not mere curiosity that prompted Norton's request. If he acceeded to Boris' request he would have to justify his action.

The calm blue eyes stared into his. He had never known Boris to lose control, to be other than completely self-assured. All the Cosmo-Christers were like this—it was one of the qualities that made them good spacemen. Sometimes, however, their unquestioning certainty was just a little annoying to those who had not been vouchsafed the Revelation.

"It concerns the purpose of *Rama*, Commander. I believe I have discovered it."

"Go on."

"Look at the situation. Here is a completely empty, lifeless world—yet it is suitable for human beings. It has water and an atmosphere we can breathe. It comes from the remote depths of space, is aimed precisely at the solar system—something quite in-

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credible if we attribute it to pure chance. And it appears not only new—it looks as if it has never been used."

"We've all been through this dozens of times," Norton said. "What can you add to it?"

"Our faith has told us to expect such a visitation, though we do not know exactly what form it will take. The Bible gives hints. If this is not the Second Coming it may be the Second Judgment—the story of Noah repeated. I believe that *Rama* is a cosmic Ark, sent here to save those who are worthy of salvation."

THE silence in the captain's cabin lasted for quite a while. Not that Norton was at a loss for words—rather, he could think of too many questions. But he was not sure which would be tactful to ask. Stripped of its religious overtones, Rodrigo's theory was at least as convincing as a half-dozen others he had heard.

"A couple of questions, Boris. *Rama* will be at perihelion in three weeks—then it will round the sun and leave the solar system just as fast as it came in. There's not much time for a Day of Judgment, or for shipping across those who have been—ah—selected—however that's going to be done."

"Very true. So when it reaches perihelion, *Rama* will have to decelerate and go into a parking orbit—probably one with aphelion at Earth's orbit. There it might make another velocity change and rendezvous with Earth."

The possibility was disturbingly persuasive. Others had mentioned it. If *Rama* wished to remain in the solar system it was going the right way about it. The most efficient way for it to slow down was to get as close to the sun as possible and carry out the braking maneuver there. If there were any truth in Rodrigo's theory—or some variant of it—it would soon be put to the test.

"One other point, Boris. What's controlling *Rama* now?"

"There is no doctrine to advise on that. It could be a pure robot. Or it could be—a spirit. That would explain why there are no signs of biological life."

The Haunted Asteroid . . . Why had that phrase popped up from the depths of memory? Norton recalled a silly story he had read years ago—he thought it best not to ask Boris if he had ever run into it.

"I'll tell you what we'll do, Boris." Norton abruptly made up his mind. He wanted to terminate this interview before it became too difficult. "Can you sum up your ideas in less than—oh, a thousand bits?"

"Yes, I think so."

"Well, if you can make it sound like a straightforward scientific theory I'll send it, top priority, to the *Rama* Committee. A copy can go to your Church at the same time and everyone will be happy."

"Thank you, Commander, I really appreciate it."

"Oh, I'm not doing this to save my conscience. I'd just like to see what the committee makes of it. Even if I don't agree with you all along the line you may have hit on something important."

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"Well, we'll know at perihelion, won't we?"

"Yes. We'll know at perihelion."

When Boris Rodrigo had left, Norton called the bridge and gave the necessary authorization. He thought he had solved the problem rather neatly. Besides, just suppose that Boris were right.

He might have increased his chances of being among the saved.

AS HE drifted along the now familiar corridor of the Alpha airlock complex Norton wondered if he had let impatience overcome caution. He had waited aboard *Endeavor* for forty-eight hours—two precious days—ready for instant departure if events should justify it. But nothing had happened. The instruments left in *Rama* had detected no unusual activity. Frustratingly, the television camera on the Hub had been blinded by a fog which had reduced visibility to a few meters and had only now started to retreat.

When he had passed the final airlock and floated out into the cat's-cradle of guide ropes around the Hub, Norton was struck first by the change in the light. It was no longer harshly blue, but was much more mellow and gentle, reminding him of a bright, hazy day on Earth.

He looked out along the axis of this world and could see nothing except a glowing, featureless tunnel of white, reaching all the way to those strange mountains at the South Pole. The interior of *Rama* was completely blanketed with clouds and nowhere was a break visible in the overcast. The top of the layer was quite sharply defined—it formed a smaller cylinder inside the larger one of this spinning world, leaving a central core five or six kilometers wide quite clear, except for a few stray wisps of cirrus.

The immense tube of cloud was lit from within by the six artificial suns of *Rama*. The locations of the three on this northern continent were clearly defined by diffuse strips of light, but those on the far side of the Cylindrical Sea merged together into a continuous, glowing band.

What was happening down beneath those clouds? The storm had now died away. Unless there were some other surprises it would be safe to descend.

It had seemed appropriate to Norton, on this return visit, to use the team that had made the first deep penetration into *Rama*. As he watched Mercer, Calvert and Myron "swimming" quickly and confidently down the ladder he reminded himself of how much had changed. The first time they had descended in cold and darkness—now they were going toward light and warmth. And on all earlier visits they had been confident that *Rama* was dead. That might yet be true in a biological sense. But something was stirring—and Boris Rodrigo's concept would do as well as any other.

The spirit of *Rama* was awake.

WHEN the team had reached the platform at the foot of the ladder and was preparing to start down the stairway Mercer

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carried out his usual routine test of the atmosphere. There were some things he never took for granted—even when the people around him were breathing perfectly comfortably and without aids he had been known to stop for an air check before opening his helmet. When asked to justify such excessive caution, he had answered: "Because human senses aren't good enough. You may think you're fine and you could fall flat on your face with the next deep breath."

He looked at his meter and said, "Damn!"

"What's the trouble?" asked Calvert.

"It's broken—reading too high. Odd, I've never known that to happen before. I'll check it on my breathing circuit."

He plugged the compact little analyzer into the test point on his oxygen supply, then stood in thoughtful silence.

He unplugged the meter, used it to sample the *Rama* atmosphere again, then called Hub Control.

"Skipper—will you take an oh-two reading?"

A much longer pause ensued than the request justified. Finally Norton radioed back: "I think there's something wrong with my meter."

A slow smile spread across Mercer's face.

"It's up fifty per cent, isn't it?"

"Yes. What does that mean?"

"It means that we can all take off our masks. Isn't that convenient?"

I'm not sure," replied Norton, echoing the sarcasm in Mercer's voice. "It seems too good to be true."

He had no need to say more. Mercer cracked his mask open a trifle and took a cautious sniff. For the first time at this altitude the air was perfectly breathable. The musty, dead smell had gone—so had the excessive dryness, which in the past had caused several respiratory complaints. Humidity was now an astonishing 80%—doubtless the thawing of the sea was responsible for this. There was a muggy feeling in the air, though not an unpleasant one. It was like a summer evening, Mercer told himself, on some tropical coast. The climate inside *Rama* had improved dramatically during the last few days.

But why? The increased humidity presented no mystery—the startling rise in oxygen was much more difficult to explain. As he recommenced the descent, Mercer began a series of mental calculations. He had not arrived at any satisfactory result by the time his team entered the cloud layer.

It was a dramatic experience. The transition was abrupt. One moment they were gliding downward in clear air—then they shot suddenly into blinding white fog.

Visibility dropped to a few meters. Mercer put on the brakes so quickly that Calvert almost bumped into him—and Myron did bump into Calvert, nearly knocking him off the rail.

"Take it easy," said Mercer. "Spread out so we can just see each other. And don't let yourself build up speed."

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IN EERIE silence they continued to glide down through the fog. In some ways, this was even spookier than descending in the complete darkness of the Raman night—then, at least, the searchlight beams had shown them what lay ahead.

Mercer suddenly braked again. When they had bunched together he whispered, "Listen. Don't you hear something?"

"Yes," Myron said after a minute. "It sounds like wind."

Calvert was not sure. He turned his head, trying to locate the direction of the very faint murmur that had come to them through the fog, then abandoned the attempt as hopeless.

They continued the slide, reached the fourth level and started on toward the fifth. All the while the sound grew louder—and more hauntingly familiar. They were halfway down the fourth stairway before Myron called out, "Now do you recognize it?"

They would have identified it long ago, but it was not a sound they would ever have associated with any world except Earth. Coming out of the fog, from a source whose distance could not be guessed, was the steady thunder of falling water.

The party glided on.

A few minutes later the cloud ceiling ended as abruptly as it had begun. They broke into the blinding glare of the Raman day, made more brilliant by the light reflected from the low-hanging clouds. There was the familiar curving plain—now made more acceptable to mind and senses by the fact that its full circle could not be seen. It was not too difficult to pretend that they were looking along a broad valley and that the upward sweep of the sea was really an outward one.

They halted at the fifth and penultimate platform to report that they were through the cloud cover and to make a careful survey. As far as they could tell nothing had changed down there on the plain—but up here on the northern dome *Rama* had brought forth another wonder.

There was the origin of the sound they had heard. Descending from some hidden source in the clouds three or four kilometers away was a waterfall. For long minutes the men stared at it silently, almost unable to believe their eyes. Logic told them that on this spinning world no falling object could move in a straight line, but there was something horribly unnatural about a waterfall that curved sideways, to end many kilometers away from the point directly below its source.

"If Galileo had been born in this world," said Mercer at length, "he would have gone crazy working out his laws of dynamics."

"I thought I knew them," Calvert replied, "and I'm going crazy anyway. Doesn't it upset you, Professor?"

"Why should it?" said Sergeant Myron. "It's a perfectly straightforward demonstration of the Coriolis effect. I wish I could show it to some of my students."

Mercer was staring thoughtfully at the globe-circling band of the Cylindrical Sea.

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"Have you noticed what's happened to the water?" he asked at last.

"Why—it's no longer so blue. I'd call it pea-green. What does that signify?"

"Perhaps the same thing that it does on Earth. Laura called the sea an organic soup, waiting to be shaken into life. Maybe that's exactly what's happened."

"In a couple of days? The process took millions of years on Earth."

"Three hundred and seventy-five million, according to the best estimate. So that's where the oxygen's come from. *Rama's* shot through the anerobic stage and has gotten to photosynthetic plants in about forty-eight hours. I wonder what it will produce tomorrow?"

When they arrived at the foot of the stairway they had another shock. At first it appeared that something had gone through the camp, overturning equipment, even collecting smaller objects and carrying them away. But after a brief examination of the scene their alarm was replaced by shamefaced annoyance.

The culprit was only the wind. Some ropes must have parted during exceptionally strong gusts. It was several days before they were able to retrieve all their scattered property.

Otherwise there seemed no major changes. Even the silence of *Rama* had returned now that the ephemeral storms of spring were over. And out there at the edge of the plain was a calm sea—waiting for the first ship in a million years.

XIV

"SHOULDN'T one christen a new boat with a bottle of champagne?"

"Even if we had any on board I wouldn't allow such a criminal waste. Anyway, it's too late. We've already launched the thing."

"At least it does float. You've won your bet, Jimmy. I'll settle when we get back to Earth."

A pause while everyone gloated.

"It's got to have a name. Any-ideas?"

The subject of these unflattering comments was bobbing at the foot of the steps leading down into the Cylindrical Sea. It was a small raft, constructed from six empty storage drums held together by a light metal framework. Building it, assembling it at Camp Alpha and hauling it on demountable wheels across more than ten kilometers of plain had absorbed the crew's entire energies for several days. It was a gamble that had better pay off.

The prize was worth the risk. The enigmatic towers of New York, gleaming in the shadowless light five kilometers away, had taunted the explorers ever since they had entered *Rama.* No one doubted that the city—or whatever it might be—was the real heart of this world.

"We still don't have a name. Skipper—what about it?"

Norton laughed, then became suddenly serious.

"I've got one for you. Call it *Resolution.*"

"Why?"

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"That was one of Cook's ships. It's a good name—maybe she'll live up to it."

There was a thoughtful silence. Then Sergeant Barnes, who had been principally responsible for the design—and who had the only master's certificate among *Endeavor's* crew—asked for three volunteers. Everyone present held up a hand.

"Sorry—we have only four lifejackets. Boris, Jimmy, Pieter—you've all done some sailing. Let's try her out."

Ever since she had set eyes upon the Cylindrical Sea, Ruby Barnes had been determined to make this voyage. In all the thousands of years during which man had had dealings with the waters of his own world, no sailor had ever faced anything remotely like this.

Her passengers took their places on the improvised bucket seats and Ruby opened the throttle. The twenty-kilowatt motor started to whirr—the chain drives of the reduction gear blurred and *Resolution* surged away to the cheers of the spectators.

Ruby had hoped to get fifteen kph with this load, but would settle for anything over ten. A half-kilometer course had been measured along the cliff and she made the round trip in five-and-a-half minutes. Allowing for turning time, this worked out at twelve kph and she was quite happy with that.

With no power, but with three energetic paddlers helping her, Ruby was able to get a quarter of this speed. Even if the motor broke down they could get back to shore in a couple of hours. The heavy-duty power cells could provide enough energy to circumnavigate this world and she was carrying two spares to be on the safe side. And now that the fog had completely burned away she was prepared to put to sea without a compass.

She saluted smartly as she stepped ashore.

"Maiden voyage of *Resolution* successfully completed, sir. Awaiting your instructions."

"Very good, Admiral. When will you be ready to sail?"

"As soon as stores can be loaded aboard and the harbor master gives us clearance."

"Then we leave at dawn."

"Aye, aye, sir."

FIVE kilometers of water does not seem very much on a map—it looks entirely different when one is in the middle of it. The team had been cruising for only ten minutes and the fifty-meter cliff facing the northern continent already seemed a surprising distance away. Yet, mysteriously, New York hardly appeared much closer than before.

But most of the time Norton paid little attention to the land—he was too engrossed in the wonder of the sea. Whenever, he told himself, he felt that he had grown inured to *Rama* it produced some new wonder. As *Resolution* hummed steadily forward it seemed to him that she was caught in the trough of a gigantic wave that curved up on either side until

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it became vertical—then overhung until the two flanks met in a liquid arch sixteen kilometers overhead. Despite everything that reason and logic told him he could not entirely throw off the impression that at any minute those millions of tons of water would come crashing down from the sky.

Too, the water was now alive. Every spoonful contained thousands of spherical, single-celled micro-organisms, similar to the earliest forms of plankton that had existed in the oceans of Earth.

Yet they showed puzzling differences. They lacked a nucleus, as well as many of the other minimum requirements of even the most primitive terrestrial life forms. And although Laura Ernst—now doubling as research scientist as well as ship's doctor—had proved that they definitely generated oxygen, there were far too few of them to account for the augmentation of *Rama's* atmosphere.

She had also discovered that their numbers were dwindling rapidly and must have been far higher during the first hours of the Raman dawn. It was as if there had been a brief explosion of life, recapitulating on a trillionfold swifter time-scale the early history of Earth. Now, perhaps, it had exhausted itself—the drifting micro-organisms were disintegrating, returning their stores of chemicals to the sea.

"If you have to swim for it," Dr. Ernst had warned the mariners, "keep your mouths closed. A few drops won't matter if you spit them out right away. But all those weird organo-metallic salts add up to a fairly poisonous package—and I'd hate to have to work out an antidote."

This danger, fortunately, seemed very unlikely. *Resolution* could stay afloat if any two of her buoyancy tanks were punctured. And even if she sank the crude but efficient lifejackets would keep the crew's heads above water. Although Laura had been reluctant to give a firm ruling, she did not think that a few hours immersion in the sea would be fatal—but she did not recommend it.

Presently New York ceased to be merely a distant island. It was becoming a real place. Details that until now had existed only as photo enlargements were now revealing themselves as massive, solid structures. It was now strikingly apparent that the "city," like so much of *Rama*, was triplicated—it consisted of three identical, circular complexes or superstructures rising from a long, oval foundation. Photographs taken from the Hub also indicated that each complex was itself divided into three equal components, like a trisected pie. This would greatly simplify the task of exploration—presumably one had to examine only one ninth of New York to have seen the whole of it. Even this would be a formidable undertaking—it would mean investigating at least a square kilometer of buildings and machinery, some of which towered hundreds of meters into the air.

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THE Ramans, it seemed, had brought the art of triple-redundancy to a high degree of perfection. This was demonstrated in the airlock system, the stairways at the Hub, the artificial suns. And where it really mattered, they had even taken the next step. New York appeared to be an example of triple-triple redundancy.

Ruby was steering *Resolution* toward the central complex, where a flight of steps led up from the water to the very top of the wall or levee that surrounded the island. There was even a conveniently placed mooring post to which boats could be tied—when she saw this, Ruby became quite excited. Now she would never be content until she found one of the craft in which the Ramans sailed.

Norton was the first to step ashore. He looked back at his three companions and said, "Wait here until I get to the top of the wall. Pieter and Boris will join me when I signal. Sergeant Barnes will stay at the helm so that we can cast off at a moment's notice. If anything happens to me, report to Karl and follow his instructions. Use your best judgment—but no heroics. Understood?"

"Yes, skipper. Good luck."

Norton did not really believe in luck, but once again *Rama* was forcing him to break some of his cherished rules. Almost every factor here was unknown—and he could do with all the good wishes that happened to be lying around.

The stairway was a virtual duplicate of the one they had descended on their shore of the sea—doubtless his observers there were looking straight across at him through their telescopes. And "straight" was now the correct word—in this one direction, parallel to the axis of *Rama,* the sea was indeed completely flat. It might well be the only body of water in the universe of which this was true, for on all other worlds every sea or lake must follow the surface of a sphere, with equal curvature in all directions.

"Nearly at the top," he reported, speaking for the record being made five kilometers away. "Still completely quiet—radiation normal. I'm holding the meter above my head, just in case this wall is acting as a shield. And if there are any hostiles on the other side, they'll shoot that first."

He was joking, of course. But only for the record. *Rama* might still have the final laugh.

When he took the last step he found that the flat-topped embankment was about ten meters thick. An alternating series of ramps and stairways led down to the main level of the city twenty meters below. In effect, he was standing on a high wall that completely surrounded New York and so was able to get a grandstand view.

It was a view almost stunning in its complexity and his first act was to make a slow panoramic scan with his camera. Then he waved to his companions and radioed back across the sea: "No sign of any activity—everything seems quiet. We are now about to enter the city."

TO BE CONCLUDED

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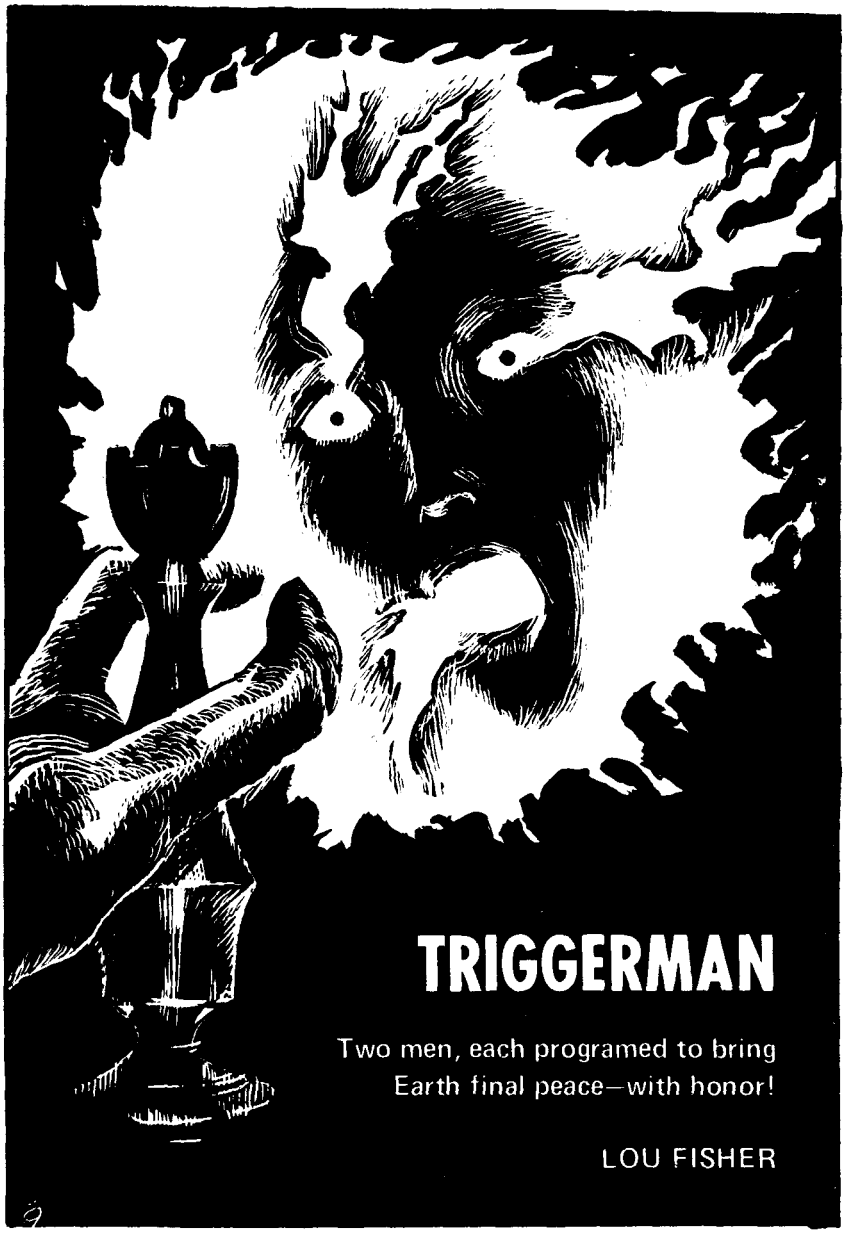

TRIGGERMAN

Two men, each programed to bring
Earth final peace—with honor!

LOU FISHER

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THE gate in Keal's mind swung open, swung closed.

The bombs were gone. He was back again on the silent planet (orange night, orange light?) at the chess table in the middle of an endless desert. Across from him the naked creature sat quite still, its pointed chin resting easily on a two-fingered hand.

"Your move, Keal," it said, the yellow mouth barely vibrating in a low monotonous whisper.

"No, I won't move," Keal replied. "We must have played a hundred games already. Maybe more. I am tired of playing chess and tired of losing." He pressed his knuckles into the sandy texture of the chessboard. "I don't even know what I'm doing here."

The creature stared back.

"We are in the middle of a game, Keal."

"I remember."

"It is your move."

"I remember that, too."

"Keal—"

"No!" He straightened in the chair, his arms folded defiantly. He knew what would happen. Still, once again he would be firm and stand his ground—but this time he wouldn't give in.

"You must move," it said again.

And then it waited. In the middle of the open land of a desert planet, it waited. Under the unfamiliar moon and the starless sky, where one small table and two chairs and two beings sat in a vast emptiness, it waited patiently, while the orange rays from no place spotlighted the black and white blocks of the chessboard, upon which intricate glass figures formed the pattern of contest.

And Keal shook his head. "I don't do what I don't want to do."

"You must play until you win."

"I'll never win. I haven't won in a hundred games and I won't win if we play a hundred more. You know yourself that even if we play forever—"

"Your move, please," the creature insisted.

"No. No way. I won't touch those damn things."

"Too bad, Keal."

The words were the warning. But Keal told himself that this time he would withstand the fire. He felt strong. He would ignore the pain. Pain was only a feeling like coldness or softness, only a sense like hearing or seeing, only an emotion like terror or anger. It was a matter of conditioning yourself to absorb it. He was ready and now he would show them. Show whom?

"Well, what are you waiting for?"

The creature beckoned.

The ball of fire appeared on the horizon, jumping and rolling in the sand. From it came a sobbing, wailing siren sound. Strangely enough, it did not appear to get bigger as it approached, as it crossed the entire desert in a moment or two, leaping and whirling and crying as it came. Not bigger but louder. Faster, nearer, louder and louder.

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Keal waited and sweated.

He stiffened.

The weeping fire moved in.

And then it was upon him, encircling and wrapping him. His skin burned. Hot blasts seared his eyes. Torture flooded his brain, pounding there, finally starting him screaming, struggling, kicking. The fire screamed more loudly.

No more, he thought. Please take it away. He'd do anything. He'd move. He'd finish the game.

Suddenly the air was clear and the pain was gone. Keal saw that his skin was unmarked. The fire had felt like napalm, but the only after-effects were the imprints scorched into his memory. That was bad enough. Keal turned slightly in his chair, picked up the white king's knight, hooked it left and forward.

"Thank you, Keal," the other said, its two fingers reaching for the chessboard.

It was very clear now that Keal had moved badly. He watched as the black crystal queen stormed the center of strength and turned the remnants of the white army into helpless bystanders. Keal was not surprised. He had seen it all before. His good move was, in retrospect, an amateurish play based on the obvious, overlooking the integral strategy of the battle. Why had he made it?

The creature leaned forward. "Checkmate."

"I don't care," Keal answered. "What difference does it make?"

"You lose again."

"I don't care."

"You lose again and again and again . . ."

THE red-haired man walked out of the house and toward the car. He was dressed much as Keal was, in chino pants and a dark leather jacket. A canteen was slung over his left shoulder. His right hand held a rifle. The muzzle thrust through the open window and stopped six inches from Keal's face.

"Speak up, buddy," the man said.

"It's me—Keal."

The rifle pulled back. The man leaned in.

"Glad you made it. We'd better get going right away. Your car or mine?"

Keal gave it some thought. "Well, I've been driving from Estes Park. If we take your car we can go with a full tank of gas."

"Hang on then. I'll bring it around."

"You're Anderson?"

The man was already moving toward the garage. He glanced back, laughed and said, "Yeah, I'm Anderson—or the last Anderson."

Keal knew what he meant.

He rubbed his hands and waited in his own car, his gray eyes staring passively at the glow of death on the Colorado horizon. Far off. But not far enough. Billows of great mushrooms, blasting and echoing, licked by shooting towers of flame, rising in an awesome mass to cover the stars and to camouflage the destruction from

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the eyes of God. There and there and there—hell and atoms breaking loose. There and there—all the distance burning brightly. There again—the hydrogen flash that was sudden death. Chaos, heat and bitter poison.

Something in Keal's mind refused to let him panic. The post-hypnotic cloud that rendered him almost incapable of fear, that had led him step by step to Anderson's house, would continue to lead him the rest of the way.

"Hey, let's go," Anderson was shouting.

Keal turned. A car identical to his stood alongside, purring. Sleek and black and powerful and lead-lined, with cartons of canned goods stacked in the rear and an extra gas tank welded to the side. Matched cars. Matched men. A job to do.

And nothing can stop us . . .

Keal picked up his rifle and canteen and switched to the other car. He leaned back in the passenger seat.

"Do you know the way?" he asked.

"Sure," said Anderson. "Don't you?"

"I suppose so."

"Well, don't you?"

"It depends on how you figure it," Keal said. He braced himself as the car swung onto the highway and picked up speed. "I never heard of you, Anderson. But when this all started I packed up my gear and drove straight to your house. That's the way it's been. I don't really know where I'm going, but I know why I'm going and I know how to get there."

"Post-hypnosis," Anderson explained.

"Sure, now I know," Keal said quietly. "And I'm just as glad they didn't tell us before. So we wondered a little—it's been a helluva good life. Subsidized playboys. All we had to do for our money was report to the Pentagon Medical Center once a month for treatment."

Anderson struggled with the wheel, roaring around a sharp curve in the road.

"They went to a lot of trouble to get us ready," he said when the car settled back to ninety. "It could have been a waste, but it turned out not to be. I'm glad it's us, Keal. Look out there at that blazing hell." He paused piously. "I want this job."

"It's all right if you like temporary work," Keal said with a cheerless smile. "How old are you?"

"Thirty-two."

"I'm two years older," Keal said.

In the distance he saw another flash on the skyline, then the soaring bubble of smoke that marked the spot. Denver, maybe, full of agony. The screaming and the dying and the dead—and the dying and the dead and the dead. He turned on the radio, twisting the pointer from end to end. No response. He checked his watch. It was about three hours since the announcement of the surprise attack, the coming of war. Now even the emergency network was silent.

"Just us," he mused aloud.

"H'mm?" said Anderson.

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"We're pretty much alone. Cut off from the rest of the world."

Anderson shook his head. "No, they're cut off from us. We're the important ones."

"Suppose we don't make it."

"Nothing can stop us."

"That's what somebody keeps telling me," Keal said. "But a bomb—"

"Bombs are for cities."

"They're not always on target. And the radiation keeps spreading."

"Quit it," Anderson said. "Nothing can stop us. So it . . . Well, remember, there are four others heading the same way. Someone will get through." He half-smiled. "We're the closest, you and me, and we'll be there first. By the time the others come it'll be all over. We can sit back and tell them how we killed every Commie in the world."

"And nothing can stop us," Keal found himself saying. The words were not his own. Neither was the thought. Yet it was his brain that had shaped them and his tongue that had uttered them and it would be his hand that . . . He wiped the sweat off the back of his neck.

THE creature was carefully placing the chessmen on their proper squares. One by one, fitted neatly into their defensive positions.

"You have the white and move first," it said, as if it had noticed no interruption.

Keal's face darkened. "Okay, I'll show you how to play this game. This time I'm going to win."

The creature shrugged and waited. Keal concentrated on the board, determined that every move be perfect. Finally he selected the king's pawn and moved it two squares forward.

The creature countered without hesitation.

The battle was on. Nothing else stirred in the great desert but the little glass things hopping backward and forward, diagonally and across, slowly and within limits, like grasshoppers in chains. A pawn was lost and then a knight. A bishop. Another pawn. The pieces toppled one by one.

Keal took a deep breath. He had led the creature into a trap. With the right move the game was his. He re-thought it to make sure—and when he was positive he took his white queen into enemy territory.

Then he watched in complete disbelief as the two fingers reached out and moved a black bishop into the vacated spot.

"Checkmate," said the creature.

It was incredible, Keal told himself. Why hadn't he seen ahead? He should have won. Anyone in his right mind could have won that game. He laughed. Maybe that was the answer. Maybe no one here was in his right mind.

"You lost again," the creature was saying.

"I don't care," Keal lied. "I just don't care."

"You lost again and again and again . . ."

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THE high beams of the headlights bounced off scores of glossy road signs, zigged and zagged among trees and poles and concentrated on the white center line that rolled on endlessly. Ninety miles of it each hour, on and on and on.

Then suddenly the pattern was broken.

Keal straightened, leaning forward to squint through the windshield. Some sort of obstruction loomed ahead. Slowly it came into focus. Giant criss-crosses of thick lumber. Red, blinking lanterns. White helmets and white armbands on three men who were standing in front of the barricade, waving.

Anderson saw it, too.

He said, "A roadblock. Looks like civil defense."

"What do they want?" Keal wondered.

"Who the hell knows? We're not waiting to find out." Anderson twisted the big car to the middle of the road and kept the speed high and constant.

Keal stared at him. "You're not—"

"H'mm?" Anderson's lips were a thin, straight line.

"You can't just rip through them!"

"Don't bet on it, pal."

"For Chrissake—" Keal reached quickly for the ignition key, but stopped when a glance showed him that he was much too late. The maze of red and white and sticks and limbs was directly in front of him, racing at him, arriving and expanding in dimly lighted cinemascope. He covered his eyes just before the impact.

He heard the sounds of all against all. Thud of steel against wood. Clamor of shouts and broken glass. Hot spinning of tires. The heavy car shook, tore free and roared on. Through the rear window Keal looked at what was left behind.

A man was draped across a snapped timber, his bloody face grotesque in the light of a swinging lantern.

Another man was on his knees, shaking a fist.

The third man was flat on the ground.

Keal turned to the front and sat quietly for a moment, hoping that the scene would fade. His hands were cold.

"That was a lousy thing to do, no matter what," he said finally.

The reply came with a shrug. "We're too important to be stopped by them."

Keal knew it was true. He settled back and studied his partner.

Sure we're important. We're the secret weapon. One touch of our fingers and there'll be no conquerors. No one can bomb us and get away with it. And why?

Because Keal and Anderson, hypnotized human robots, were on their way to a certain cave in a certain mountain to a certain trigger that would fill the sky with fiery rockets of retaliation.

Button, button, who's got the button?

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His head was full of firm instructions—pushing him, yelling at him, pleading with him. There was no rest from it. Post-hypnosis, the seed that bloomed when the bombs snapped their fingers and sent the tiniest army of all time marching to complete the last war.

"So we killed a couple of guys on our side," Anderson was explaining. "They'd be dead in a few days anyway. We'll all be dead—you and me and everybody." He stretched his arms on the steering wheel. "Want to drive for a while? I could use a break."

"Sure," Keal said. When the car stopped he got out and walked around it.

Anderson was already relaxed in the passenger seat with a can of cold beans and an opener. "Funny," he said. "We're ready to die and we still have to go on eating. But if we can make it to the trigger, if we can get every damn one of them—"

"Nothing can stop us," Keal repeated automatically.

Anderson grunted and dug the spoon into the beans. Keal didn't look at him again. He drove straight and fast, mulling over the implanted orders that kept him on the track.

THE legs of the chess table were wedged into the barren sand. The chairs at either end were placed in perfect symmetry. The beacon of orange light formed a cone that reached to the sky where the faceless moon hung, ignoring the small spot of action.

The creature arranged the thirty-two chessmen. The words sneaked from its yellow lips. "Take the first move, Keal."

It was time to play the game.

"Dammit, no!" Keal said, glaring at his adversary. If he couldn't win he had to stop playing. Somehow he had to break it up—to break out of this dream or whatever it was, to scramble the system.

"Eventually you will make the move," the creature said in a low tone.

Keal shook his head. "I can't keep playing. No more."

"Too bad, Keal."

It beckoned.

Keal looked up to watch it come. Far off, someone struck a wooden match and the ball of fire was born. It skipped and danced, flared and wept. The siren sound rose higher. A wild spark, it skimmed across the empty planet with fantastic speed and deadly aim, coming hard at him, crying in its final lunge. Stinging fire everywhere.

Keal clamped his teeth until his mouth bled. Then he yelled for mercy.

All was quiet again. The pain vanished instantly. The creature calmly waited.

Keal led a white pawn. He was sure now that he could never resist the fire—therefore he could never refuse to play. One move followed another. It occurred to Keal that the

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only way left to end the madness was to win a game. But he had used all his skill and he had always lost. Well, he would try again. At least it was better than the fire.

"Your move, Keal," it said constantly.

"There's a way to beat you," he answered. "Some day I'll find it."

SUNRISE. But the clouds were dark and sick. Keal felt his body tighten as he sensed the nearness of their destination. He stopped the car in a green, wooded valley. He had driven down a sloping hill—the other side was a high mountain.

He put on the handbrake. "I guess we walk from here."

"Right," said Anderson. "C'mon, let's not waste time. We've got to be first."

Keal climbed out, but not hurriedly.

They took the rifles and the rations and the voices in their heads and started up the mountain along a path that was mapped in their nerves. Up and up, and all the way they were watched by screeching birds and rabbits on the run—ignorant beings who still had visions of tomorrow.

Anderson climbed onto a jutting ledge and pulled Keal up after him. The ledge was wide enough and flat enough to let them walk side by side. They knew just how far to go. They knew just where to turn and stop. Briefly they studied a curtain of foliage, then used their rifle butts to hack their way through it.

Keal followed Anderson into the cave.

A switch at the entrance animated a string of lights that extended as far as Keal could see. Otherwise the cave was nothing spectacular. Made completely by nature, its height and width and direction varied at nearly every step. But it was deep and traversing it took time—until finally it ended at a heavy steel door.

Keal looked at the combination lock.

He said, "There had to be some extra protection. I guess we're supposed to think of the right numbers."

"Let me try it," Anderson offered.

In a minute he had the door open.

Keal's eyes probed the large natural room. At the center of the far wall, imbedded in rock—the trigger. No decorations, no intricate gadgetry—just one short unmarked lever. That was all. But Keal could imagine the fantastic setup that lay beyond, that stretched from ocean to ocean.

Anderson anxiously rubbed his hands. "I'll flip you for the honor."

"Let's wait a minute," Keal said.

"What for? To let the others get here? Not a chance."

"Well, we ought to think about what we're doing."

"Think?" Anderson snapped. "Who the hell are you? The thinking and planning have already been done—and by men who are a lot smarter than you'll ever be. Get it straight, Keal. You're nothing but a machine. Act like one!"

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KEAL stared down at the chessboard. The game was almost finished. Each of them was left with a few major pieces. Most of the pawns were off the board.

"Your move," the creature said.

Keal studied the squares. The layout was perfect. It was all in his favor. Although there was one move that would trap him completely, another would quickly give him the game. All he had to do was move his white queen in front of the other's bishop and he would have to win. He reached for it.

But he hesitated.

This is the one that should be moved, he told himself. *It's very obvious. Or so it seems. What was it Anderson said? You're nothing but a machine. Act like one!* If he were really playing under his opponent's influence . . .

Keal struggled to clear his head. If the creature were playing both ends, then he was simply following its will. In that case the right move became the wrong move. No matter how it looked and against all reason—somehow the wrong move became the right move.

His fingers were damp. He forced them away from the queen and swung his hand over to the left corner where the rook was protecting his king. His ears were pounding, his neck veins throbbing. *It's the wrong move,* something in him insisted repeatedly. *The other one, the other one* . . . But he kept his hand where it was and with tremendous effort—leaving the white king defenseless—he pushed the rook all the way across the board.

He sat back. It was all very clear now. It wasn't his king that was trapped. The white army had crushed the black. Checkmate. He'd won. He'd actually won.

"You did that very well," the creature said. "There's no use playing another game. I'm afraid you would win every time."

"I don't care," Keal said.

"You'd win every time every time every time . . ."

FROM the distance of a few feet Anderson had turned to look back at him. The trigger was about twenty steps farther. Keal knew he should go blindly to the job, rather than wonder about the hole in the post-hypnosis. Probably it was an accident of some sort—some unforeseen quirk of his own mind had refused to yield. But he considered something else. In a way Anderson was right. All the arrangements had been made by the best men in the country. Perhaps they were better and smarter than anyone realized. Perhaps they had purposely left one man some ability to think for himself—or set up the challenge of a strange orange planet—just in case the situation added up to zero.

Well, maybe they had.

And maybe they hadn't.

Either way it ended here—in a mountain of nuclear buckshot. Part two of the war, Keal reflected grimly. But what kind of war is it where

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everybody loses, where nothing is left but charred flesh and boiling flood, where the Earth becomes desolate and useless and gone to limbo? What kind of war is that?

He started to raise the rifle.

"We're not going to do it," he said. "Half the world is still alive."

Anderson's eyes were flat and frozen. "We're making sure it comes out even. We're giving it to the bastards who gave it to us." He was walking toward the far wall. "All right, if you're scared—I'll do it myself."

Keal lifted the rifle higher, moving it to follow Anderson across the cave.

He yelled, "Stay away from there!"

Anderson didn't look back. "You can't threaten a dead man," he said and he ran for the trigger.

Keal fired.

The shot hit Anderson in the lower part of the back, dropping him to his knees. White-faced, he crawled forward, the blood trailing behind him, the trigger in front of him. Keal shot him again—once, twice, three times more—until Anderson fell flat in the dirt, his fingers still groping.

Keal locked the steel door behind him and returned to the dismal daylight at the mouth of the cave. There were other men still coming, he thought. Four other triggermen, with Anderson's determination, coming to seek the height of glory. Well, no one, no one . . .

He sat and reloaded the rifle and waited. ★

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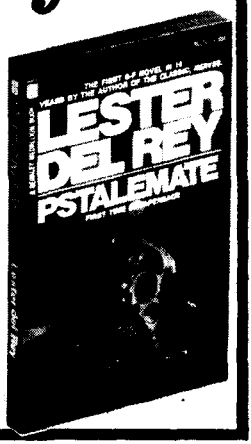

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GALAXY BOOKSHELF

Theodore Sturgeon

STAR TREK was—and is—a phenomenon in television, launched in 1966 at the old Desilu studios, attaining immediate and growing popularity, achieving a third season—after the network's firm decision to cancel it—because of the near-hysterical pressure of its fans, and then going into syndication, where it has proved so successful that the reruns can be seen or will shortly be seen all over the country. At one time recently in New York it was possible (for viewers properly placed) to see *Star Trek* four times a day, and there were adherents who did. The show evoked a periphery of fans, fan clubs, literature and conventions which continue to grow and flourish, recently melding with wider-interest science fiction conventions like last spring's *Equicon* in Los Angeles at which the attendance approached ten thousand and *(mirabile dictu)* the banquet was sold out.

Born with *Star Trek* was the writing career of David Gerrold, whose very first sale anywhere was a *Star Trek* script called (finally) *The Trouble with Tribbles,* and who has in the short time ensuing run up a formidable bibliography which includes the Nebula-nominated *When Harlie Was One.* Personable, apparently relaxed, rather inexcusably young, he writes 120 words per minute and does it for four hours a day, every day. He apparently spends the rest of the time watching the angles, and he hits them all. At the *Equicon,* though he had no official status in the convention machinery, he was everywhere—on panels, chatting, autographing, MC-ing, participating in every conceivable way. Whenever things ran late and the wall-to-wall fans began to grow restive Gerrold was there, joking, lubricating, patching, persuading, filling in. In the sales room he had a table

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of his own stocked with his various published collections, anthologies and novels and a large cage full of tribbles—balls of soft fur which he makes himself—and sales were brisk. He's a go-bird, a kind of Harlan Ellison without the abrasion. All of which would be insufficient were he not, in addition, a bright and articulate writer with an engaging style in his nonfictional work and a fine wide spectrum in his fiction; he is one of the very few writers around who recognizes the value of shifting style and pace and approach in his work—a knack unrecognized or impossible to the great many better-established writers he is destined to surpass.

Typical of his comprehension of the angles: he had ready for the *Equicon* two new books *The World of Star Trek* and *The Trouble with Tribbles*, both from Ballantine, each $1.50. The former supplements and expands on the Roddenberry-Whitfield *The Making of Star Trek* (Ballantine, 1968) and is especially rich in personal anecdote, giving a fine view-in-depth of the show with an unusual cognizance of the fact that people made it, that it was successful because it was about people and because people—not just faceless "viewers"—responded to it. For me the book was full of nostalgia; *Star Trek*, especially in its first and second years, had an *esprit* I have never again seen on any Hollywood lot.

The Trouble with Tribbles is Gerrold's account of the nascence and development of a single script—and a scripter—and is required reading not only for sf and *Star Trek* addicts, but for anyone interested in writing anything for television. The two books are an engaging addition to your basic library—and Gerrold, to the sf firmament.

AND speaking of engaging reading, don't miss R. A. Lafferty's *Strange Doings* (DAW, 95¢) or Larry Eisenberg's *The Best Laid Schemes* (Collier, $1.25). Both reprints of recent hardcovers, both short-story collections, they have this in common: outrageous imagination, rippling humor and a profligate use of the unexpected. I have written before that one day the categorizers will get around to describing fiction as westerns, whodunits, howdunits, fantasy, science fiction, lafferties—otherwise the output of this zany, magic, musical, philosophical nut can never be captured in any corral. I love the way Lafferty sips, nibbles, chews on language—oh, he loves the feel of it on his tongue, and if you want a special joy, read any of him aloud to people who love words. Eisenberg, too, has a special kind of humor, a balloon-popping irreverence. Many of his stories attack academic and scientific smugness,

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but in the course of them he also throws away deadpan lines which knock props out from under many an icon. For example, in a wild story about the disappearance of millions of people from the borough of Manhattan, he mentions offhandedly a startling rise in pupils' reading scores, due to the disappearance of so many teachers. Eisenberg's prose is peppered, salted and spiced with this kind of thing. Read him with joy.

A HARDY perennial is Gordon R. Dickson, whose new collection *The Star Road* (Doubleday $5.95) is most welcome. It consists of nine fine stories, all but one previously unanthologized, from various sources and a good many years, the earliest being 1952, the most recently, 1969. The book is a good way to acquaint–or reacquaint–yourself with one of the better, solid, reliable storytellers around. I especially liked *On Messenger Mountain,* in which the author builds up a thrumming tension that left me limp at the end.

AS FAR as I know *The Year of the Rats* (Walker, $6.95) is Barbara Guignob Ricci's first novel and I do hope it won't be her last. She writes a supple, articulate prose and the thing she writes about is indeed a simple one–compassion. To say what she has to say she uses a frightening overpopulated scene in which the guarded central "city" can only survive by mass-murder of the billions outside, but that's not what the book is about–it's about compassion. This is one of the times I genuinely regret I don't have the space to go into more detail; but try to get this one–and the ones she'll write after it.

LIN CARTER has produced Volume II of his *Great Short Novels of Adult Fantasy* (Ballantine $1.25) and they run from great to quaint. George MacDonald, Ernest Brahmah, Robert W. Chambers and Eden Philpotts are represented in a worthwhile follow-up to its worthy predecessor . . . Isaac Asimov's *The Hugo Winners, Vol 1.* is now in paperback (Fawcett, 95¢); it has nine of the greatest, with the years 1955 through 1961 represented, and of course some delightful comments by The Good Doctor. You can't go wrong on this one . . . *Crash Go the Chariots* (Lancer, $1.25) is Clifford Wilson's sensational rebuttal of Erich van Daniken's *Chariots of the Gods,* which later produced one of the more sensational TV specials of recent years, *The Ancient Astronauts.* One is reminded of Col. Robert Ingersoll and Immanuel Velikovsky and many, many others to whom assertiveness is more of a means toward truth than patient and dis-

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EDITOR'S PAGE

Re: October, 1973

Everybody with a future has gotten off the Earth in Michael Kurland's fine new novelette *(Think Only This of Me)* in *Galaxy's* forthcoming Thank-You-All October '73 issue. No holocaust has struck. Earth is well and verdant, nicely populated and richly clothed in memories. Its contented, cared-for and genetically engineered humans live endlessly in the great millennia of man's past—each separately created for them—forever finding fire, inventing the wheel, the automobile, the airplane, the jet, smashing the first atom, making the first space flight, tirelessly reliving man's dream of reaching the stars.

The off-Earth humans, though, have reached the stars and won them. Those men and women are what the story is about, and it's a beauty. So buy, borrow or steal the October '73 *Galaxy*. And read it.

It is barely possible that I, too, am a little off the Earth at this moment. October '73 mileposts more than *Galaxy's* return to monthly publication—it celebrates the return of a vagabond month to your calendar and mine. While we have had stretches of monthly publication on occasion, we have not had an issue of *Galaxy* dedicated solely to October since 1969.

But what, then, is to come in the memorable October *Galaxy?* I asked the company president and the many friends of yours and mine who author the field and the answer shapes up--solid.

More than 20% additional wordage, the result of a new and tighter type face, will make it possible for us to launch a momentous new novel, James White's *The Dream Millennium* (our traditional first publication anywhere) coincidentally with the concluding installment of Arthur C. Clarke's historic, two-part *Rendezvous With Rama.*

October '73 is also Ursula Le Guin, 1972 National Book Award winner, pondering the gain—or loss—if man had to trade his humanity for the Ultimate Answer to his quest for knowledge. That's the stuff of her latest novelette, *Field of Vision.*

And October '73 is Ray Bradbury meditating—in *Ode To Electric Ben*—on the 221st Anniversary of Benjamin Franklin's first announcement—in the October 19, 1752 issue of his *Gazette*—of his lightning-taming electric-kite experiment, reordering his world and ours.

October '73, of course, is Theodore Sturgeon's new and longer *Bookshelf*, plus a sparkling new Sturgeon story, *Agnes, Accent and Access,* featuring Merrihew, the troubleshooter. And more. The month is still open.

But while we are name-dropping, let me add two more. In the issue of *Galaxy* you are now reading you will find Michael Hatt's *Circle of Flies,* which is not only his first published story but the first he submitted anywhere. And Lou Fisher's *Triggerman* . . . Let me know what you think.

—JAKOBSSON

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I

QUICKENING

Man thought himself alone till CosCros scratched the Earth creature—and found an alien!

W. MACFARLANE

THEY left CosCros a barrel of water and a knife with a short, rounded blade for prying shellfish off the rocks and opening bivalves. It was an island small as a roof and tall as a house, with no shelter, no vegetation and no fresh water. After the second sixday alone he began whetting the knife on a fine-grained rock. After a sambat he was talking to it as his only friend.

His friend helped him kill a small octivort in the crystal ocean, but in a spell of dead calm weather—when he had stopped eating and speaking and the water in the barrel was hand-deep and green with algae—his friend drew a thin red line across his wrist and he threw the knife tumbling into the

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sea. It stuttered sunset remonstrations back at him. He lay face down on the rock. He was done with friends.

That night a squall dumped two fingers of rain on the island. It overflowed the shallow catchbasins CosCros had cleaned of sand and seawrack. It washed the salt grime from his body. It washed away the last of his hope for justice. He had been accused, betrayed and condemned by the Question Framers. The electorate had voted 92.6 per cent in favor of his death, but the answer had been implicit in the question: Should the traitor CosCros die? The men who framed the questions ruled the world. There was no recourse in direct democracy. He had been put on the island and his execution out to bid.

Eight years had passed since the last time the vote had gone over 90 percent—when AlaGran, the pirate, had abrogated the will of others and the skene of Jannali had beggared itself with an unexampled high bid. The Jannali had enlarged their amphitheater and put AlaGran arena with an octivort. He had killed and eaten three before the fourth octivort had eaten him. He had lasted three sixdays and the ticket sales alone had covered the bid price. The food concessions, the entertainment licenses, the lodgings and mementos had made the Jannali affluent. It had been a worthy end for a pirate.

But for a man who wanted to save the world?

CosCros lay on his belly and drank the sweet water. Whoever threatened the instant expression of public desire should anticipate a skene with a population of one. The man who holds a mirror to the incoherent beast with many heads should realize he will be condemned to single sovereignty, left to institute his own reforms and plan for a future as nebulous as . . . as that smoke on the horizon.

It was not the excursion boat he expected with a cage on deck. It was an Implementation ship under forced draft, the smoke streaming away in the wind, the bow waves thrown high and the wake rolling cream-green behind. It approached smartly. The boom was rigged. The ship stood off the sheer north face of the island. The net swung out, CosCros timed the surge and was swept up like a child in a swing. The ship was underway before he had been lowered to the deck. A sailor steadied him against the pitch and roll. The deck shook under the thrust of the screw. He was led below to the central cabin.

GRISONGIR was sitting at his ease. He was a big man with a high forehead and heavy jaw, tumbled brown curls, a voice smooth as a barrel of oil. He waved negligently to a chair and dismissed the guard. CosCros had trusted him. He trusted him now to serve his own interests.

"Due to an unforseen circum-

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stance, CosCros, the bid award is delayed. I hear that Jannali are thinking in terms of an irax an hour to be released in a caged arena—the prisoner to be awarded an hour and twelve minutes before the next. Then an hour and twenty-four, an hour and thirty-six and so on. Mad vicious little beasts. And Moorine are said to have some notion of a glass oven. The prisoner would be fed on the fungus that kills when half-cooked." His voice grew contemplative. "The weight of a man in the oven is required to activate the heat."

CosCros felt a stinging sensation high in his nose. The chair felt infinitely luxurious after bare rocks. He was secure from the empty bowl of the sky in the cabin. The mellifluent voice was balm after the mindless mutter of the waves. His hatred was not diminished, but what a wondrous thing was man!

GrisOngir spoke with more emphasis. "There are the usual variations of the shooting gallery, but the Tintenbar are reported to have a really ingenious notion. They propose a tracked maze down the side of the amphitheater and the prisoner flat on a cart, his head projecting over the front. Down he goes at random—they say—along the pathways. They contemplate many resolutions to the pattern: food, a beast to fight, a maiden to bed and perhaps—entirely at random—a very solid post."

CosCros marveled at the ingenuity.

"Once a day, down you go through the maze. It is a most expensive idea and has aroused great interest, but bids were sure to run high for the denigrator of democracy, the arch-deviationist, the unashamed elitist. That's you, CosCros."

"Why is the bid award delayed?"

"To the heart of the matter!" said GrisOngir admiringly. "It is simple enough. We have found a use for a devious, suspicious mind. Your observation is acute, no matter how flagrantly impolitic. Consensus democracy will not tolerate a challenge to the rule of law."

CosCros was silent.

He had given GrisOngir his allegiance to elect him Question Framer from Yelavon. Had hope been betrayed the day GrisOngir had said he would implement their hopes for the future and climbed aboard the steamcar for Crux? No hope betrayed. GrisOngir had been true to himself.

"For the proposed service we will grant you null status—no mandatory ballot and optional voting rights."

"A handsome offer." CosCros rubbed a finger on the smooth edge of the table. "When do you want me to stop the sun? Or bag the wind? Tell me, at which end of the hairy vorticor do I stand—the teeth or the flatulence?"

GrisOngir ignored the childish vulgarity.

"A ship from the stars has landed at Crux. The aliens are men. They call their home Earth. Their planet

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circles a sun similar to our own. How far? The answer is in terms of the distance light travels in a measured period of time. The terms are meaningless. Give them a droos to wear instead of their peculiar garments, put a cup of beer in their hands and you could not tell them from AhwRahn, the common man."

CosCros stared at him. "Why?"

"Of course. Why have they come and what do they want? It may be as simple as why we travel the skenes. Why do we build bridges between them? Why run steamcars around the two rings? Why do we sail the endless ocean to the ice, searching for islands that exist only in fanciful tales? Because they are there—even when they are not!"

Suit your style to your idealistic audience, thought CosCros, *and so encourage this image of a metaphysical cloudhead.* "Have they seen God in their travels? Do they have gods?"

"As many as we. In the service of their gods, will they enslave our people and take our treasures? The answer is one of many we must find."

CosCros held the table light with both hands. He was a leaf in a torrent of information, spun by the smell of food from the galley, the motion of the ship, the colors and shapes and sizes of human constructions as opposed to bare rock and sea and sky.

"What is my function?"

GrisOngir rubbed his face to an expression of candid honesty. "If I remember the judgment—you are an ethical imperialist, a truth-bender, a contamination to the young and an advocate of slave work morality." He smiled without humor. "We need such a person to understand the aliens. If you refuse—"

"This is my world." The obvious. "You made me Question Finder in Yelavbon." Flattery. "It is better to be a live skink than a dead octivort." Meeching self-interest.

"Agreed. You are true to your skewed reality. Fortunately for you, it now coincides with my own." He said benevolently, "You look like AhwRahn after a sixday drunk. Go through that door. They'll take care of you."

COSCROS luxuriated in a scrub-oil bath, was dressed in a rich orange blas and darker droos and enjoyed the skills of a barber who clucked his tongue over the neglect of man's crowning glory and shaved his beard and curled his hair in a style he had never worn before. He was served a simple meal. He sipped a glass of distilled beer and enjoyed the volition-free state of travel so praised by the poets. He did not believe a word of the promises made him.

In the timeless zone of travel personal danger was as hypothetical as the monsters from space in his future or the rock in his past. What he thought about was the stranger in the barber's mirror, burned brown and gaunt by the sun and made wary by solitary confinement. There was an unfamiliar set to the jaw. The

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dark-gold eyes smoldered. Who he was and what changes had occurred would be determined by his reaction to the high probability that when his usefulness was over he would again face betrayal and death.

The ship steamed discreetly into the bay at Crux the next afternoon. The fishing boats, the sea-plant scows, the ferries, the green-garden rafts up the river and the swarms of houseboats were the same as ever. So was the pall of smoke, the harbor garbage and the stink of the brown river.

The men on the streets wore checkered I-have-voted patches. The crew had the old red-and-white stripes with the barred exemption for sailors. CosCros wore a temporary null with the white cross on black. He read the ballot outside the poll while GrisOngir and the crew voted and got their checkered patches. Mother and skene questions: Should cargo boats charge one freight for Damanami skeul wood? Obviously, yes. Should the beer allotment be decreased? Obviously, no. Should land returning to skene control from entrepreneurs carry an increased minimum bid price? Yes, otherwise where would the money come from?

All misapprehension to the people, CosCros said to himself without emotion.

He turned and looked up at the ruined fortifications of the CruxCos kings in the days before democracy. The spaceship had landed in the great courtyard. He could not see it from below. He wondered if the representative democracy he advocated could be essentially another form of tyranny. There lay the problem: one man's benevolent despotism is another man's half-cooked fungus.

A labor master trooped by with his boys and girls, for once a good-looking crew, alert and well fed. A senior mendicant with a dwarf came whining to CosCros, caught sight of his face and sidled away. A bompan man blew the ash from his coals and offered to cook whatever was brought him. A dye merchant carried cerise cloth on his arm. A milk woman with a baby on her hip bared a breast and squirted the eye of a wizened stall-keeper who screeched at her to move on.

CosCros shortened his stride to walk with GrisOngir through the open market to the base of the cliff. The swarms of men and women getting and spending, children underfoot, begging and eating, haggling and drinking, did not affect him as once they had. Was devotion to the public weal a sickness from which he had been cured by isolation?

THE elevator driver spun the wheel when the car was loaded. Water gushed from the tank into the channel until the lift rose freely, drawn up by the weight of the descending car. GrisOngir and Cos Cros disembarked on a tableland striped with crops and salted with houses that overflowed the city on the alluvial plain. The artesian bore

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and tank serving the elevator had once stood inside the castle wall, now many years gone, but the inner stonework remained as testimony to the oppressive past. They walked through the zigzag entry into the paved courtyard.

The starship was a flattened sphere six men tall and ten wide at the belt line. It loomed over the myriads in the court milling around the base of the ship, reading the graffiti scrawled as high as a man could reach. A group of drummers lounged in the shade of a wall. A teacher huddled with a class of pre-voters. Lackadaisical women from one of the farms hawked minced fruit in halfshells. Four steamcar men were feeding two happy girls in country hats.

A bright yellow ramp extended from a rectangular opening. A guard was ignoring a woman who insisted the ship be moved because her corybantic band was hired into the court a sixday from now. The lead treble drummer was picking up tempo and the others patterned around his beat. CosCros found his heart following the treble up a beat, then faster in an insistent progression.

GrisOngir stopped. He unhooded his octivort eyes, flat gray and ruthless. "Give no refusal. None at all."

CosCros followed him up the ramp. The ship had been built under a far sun and not of wood, stone or metal. The boilers had to be fantastic to move it through the thin empyrean along an invisible track, by intangible cogwheels. He abandoned all attempts to understand in the entryport. He saw a deep room illuminated by forced flame sliced thin and fixed cold in the ceiling. The cupboard doors on either side were filled with—wings for flying? Gold wire in coils? Filled with exotic food cured by syrup so sweet a spoonful fed a man for a day?

A tiny figure moved in the wall. It opened its mouth and gibberish came out: *"Is this our guineapig?"*

Were there hordes of hand-high aliens, fanged and irax-vicious, hidden in the cupboards?

THE inner wall split and each door slid away. The room beyond was large and circular. The floor was covered with rugs over a resilient carpet and the man whose miniature had been in the wall was sitting in a chair, turned to the entry.

"Welcome aboard. Oh, the writing instrument of my mother's sister! *How's that?"* His legs were individually encased in cloth. He wore a short red blas and another over it, of black and white checks. He said, "My name is PeTersNel," and his face became fixed forever in CosCros' mind.

Question Framers sat in a double arc of spindly chairs against the curved wall. The ghost of a shimmer hung across the room between the men and the three aliens. Pedantic young DasiKan tapped a slate with a wand for attention. "A writing instrument," said DasiKan, "is a tool for writing—"

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CosCros sat down and gripped the chair seat. The room was thick with inexplicable devices. The commonplace was not what it seemed. Behind the starmen were windows, but each showed a different direction. The worst was the window looking down at the spaceship, the courtyard, the cliffs and the tiny, moving, foreshortened people from high in the air, all fixed on a vertical—yes—a vertigo wall.

PeTersNel had gray eyes and high cheeks and straw-yellow hair. His face was melancholy and mocking. It was also vital and innocent. He was clean shaven. He turned his head and CosCros saw a burr of gold on his cheeks. He was older than CosCros. He was younger. CosCros groaned silently. The smile on those lips could mean he was figuring ways to butcher plump young DasiKan, who was tediously explaining familial relationships with drawings on the alien board that held lines *inside* the glass surface.

The slender starman with the dark brown hair had sleepy eyes bright as coals in a cave. He wore lazy arrogance like a droos and calmness like a blas. He was a sheathed sword in quiet and bloody potential.

The third man sat in a condition of arrested momentum, like an enormous stone in the middle of the air. He was bigger and broader than the other two, relaxed and inevitable as the fall of night. His face was ruddy, his hair white, his expression placid. Was he thinking of recipes? CosCros put the question to himself harshly, in a futile hope of diminishing the impact, the fascination of this contradictory trio.

PeTersNel cut short mother's sister's married relationships. He said they would see a recording of Earth to complete the day's work. The windows faded to a single large picture of an unsupported ball, mottled white and blue and brown. The ball expanded until it was Earth with a harbor, with ships of sea and *air* and land. The buildings were gigantic, but Earthmen also had trees and green grass. They had enormous oval amphitheaters. They tamed weird monsters. They farmed to the horizons. They held back rivers. Their casual mastery of the world, the bewildering scope and variety of their activities was presented against a background of alien music more insistent than drums. When it was over CosCros slumped in his chair, bludgeoned by the intensity of his attention, stunned into a lassitude of shock.

The slender alien was speaking. He said the danger of contact was real, and this was why they maintained the *force barrier,* the invisible division between themselves and the men of this world.

GrisOngir replied the Framers understood disease and would not hold the aliens responsible if the volunteer died. They hoped he would not prove infectious. In fact, he had been living in isolation since the landing for this very reason.

All eyes turned to CosCros.

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II

HE STOOD up. He kept a properly sober face. It was lunatic comedy that GrisOngir should smile as his new treachery was accepted. This was throwing an octivort into the ocean to drown. There was nothing CosCros wanted as much as to stay with the Earthmen.

The Question Framers filed out of the spaceship. The inner entryport doors closed. The shimmering barrier snapped and was gone.

PeTersNel stretched and said, "Nice to have you aboard. You understand that time is needed for all things, from seed to flower, from stranger to friend, from alien menace to a comity of understanding without alienation."

"Why do you take lessons," asked CosCros slowly, "when you are fluent in our tongue?"

"It's a trick," said the slender man. He yawned. "It's also common sense to give you weight, to balance your special knowledge against our own." He was not sleepy. "I'm WilDysE."

The broad-shouldered man with the white hair sighed. "We overwhelm. There is no way our landing will not be a shock. We try to restore confidence by being less than omnipotent. My name is BranDer, ChaRlz-BranDer."

"I am overwhelmed," said CosCros. He sat down abruptly. He knew no ritual for social conduct with starmen. He would have to be himself—whatever he had become. They waited. He said, "I have a feeling you have done this before.'

"Do you know?' asked WilDysE.

BranDer blinked.

PeTersNel swung a chair around and straddled it. "You are the first man to make this observation on all the planets we have visited," he said pleasantly.

"Why?" asked CosCros.

BranDer said, "Why visit other planets? A good question. Perhaps to socialize. To be neighborly. To visit relatives and—through meeting them—to understand ourselves a little better."

"Greed," said WilDysE. "Simple honest need 'To strive, to seek, to find and not to yield.' Who wants to be an Idle King? Tennyson was a great poet in spite of himself."

"Maybe we're looking for God," said PeTersNel.

"We don't like to be God," said BranDer.

"Having tried it," said WilDysE.

PeTersNel said, "When we were Earthbound we could anticipate marvels. Intelligent arachnids or reptiles, star kings and galactic empires, talking plants and talking planets. Oh, we had the gaudiest kind of dreams—alas, lost innocence! What we have found circling the far stars is man—and only man. We don't know why. And last and worst, we are the advanced race."

"A deadly disappointment,' said BranDer.

"This is why we keep searching,"

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said PeTersNel. "We are looking for someone else to blame, to give us revelation, to take responsibility."

"My name is CosCros." He was deeply moved. "I am pleased beyond saying to be with you." It was ridiculous to think that truth was freedom, but anything less than the available truth became incentive to it. He did not entirely believe the Earthmen, but whatever they wanted here their preoccupations were of the same order as his own.

"Then let's eat dinner," said WilDysE. "Come on CosCros. Kitchen and bedrooms are upstairs. All the machinery is downstairs—this is where we work. Let's go, PeTerDamIt—philosophy is tolerable only with a full belly."

CosCros followed through a door and up perfectly ordinary stairs. If the strangers had consciously set him at ease, what else should they do? If they were more or less than they seemed, what man is not? He could deal with them. He walked into the upstairs room with modest confidence.

It was filled with women.

PETERSNEL introduced MariAn and Jen and CaMila and Fay and BarBarA. They wore brighter colors than the men and far less clothing. Women had appeared in the picture of Earth, but they had been no more real to CosCros than the ships of air or the incredible buildings. If women existed in fact, then Earth must exist in reality. He stood bemused.

BranDer saw his difficulty and took him to an ablutions room. He explained the mechanisms, challenged CosCros to wash his hands and patiently explained again.

The meal was bright red lips, bold eyes and silky hair and the confused realization that women were peers among Earthmen. They dressed—or were undressed—shamelessly—or shamefully—and exposed their navels without qualm. They calmly exposed six bare toes on each bare foot. They spoke to him freely and they were kind to him. Their kindest act was pouring half a tumblerful of *whiskey* and putting him to bed in one of the bed closets around the room. *"He is emotionally exhausted,"* said BranDer. "Sleep well, CosCros. You have journeyed to Earth today and that's enough to tire any man."

The next sixdays were forever jumbled. CosCros thought it was because he could not distinguish relative values and all the things he learned were of indeterminable consequence. He did not forget the real world. His belief that death awaited him settled his mind and concentrated his attention. The Earthmen gave him the *English* language in direct imprints under a helmet. His understanding surprised them.

"On some other worlds," said sturdy MariAn, "the cultural lock made learning impossible."

"How could you learn my tongue so fast?" he asked.

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Plain Jen said, "Computer analysis and rationalization. Plus a long history of trying to be culture-free, which is impossible."

"And the quick imprint," said Fay, plump and smiling. "We also try to understand the common denominators."

CaMila said, "All men eat, drink and snore."

"It beguiles the observant mind," said languid BarBarA, "that on every world the old trinity rules or death results: identity, variety and security."

CosCros shook his head. "I will never understand."

They protested, but he meant he did not expect to be allowed time for understanding. He soaked up information like a child. He was shown the drive engines where a small sun was entrapped, he saw the microfiche files and the retriever, which supplied data on a molecular level to the manufactuary. To please him, BranDer programed a writing instrument and it was spun—it took place—it happened together—it was made before his eyes. It was a light-negation pen that unreflected light on any surface. The gadgetry was only technological wonder—it was the friendship and trust, the courtesy and thoughtfulness the Earthmen showed to him and to each other that amazed CosCros. They had no meanness of spirit. They quarreled and laughed and argued together in amity. He found this sadly suspicious.

The language lessons progressed in the room below. The Question Framers slowly came to regard the Earthmen as lucky relatives who had struck it rich. It seemed possible, then reasonable, then only right that they should share the wealth. CosCros watched the screens in the room above. At first he was shamed by the Framers' transparent interest in changing lead to gold, but when he saw the oblique encouragement the Earthmen offered he forgot apologies.

The Framers were especially charmed by a magic fluid that occurs when certain particular requirements are met, to provide illumination or heating or turning wheels or saying yes-no, yes-no a million times in the time it takes a man to breathe—and thereby solving any problem. If electricity were man's right and heritage, then they should be given it. As they learned more of Earth the Framers grew eloquent in favor of advanced weaponry, aircars, medicine, mountains of food and immortality.

CosCros listened with growing disquiet.

PeTersNel said that Earthmen had learned these things—but not immortality—through a sharp discipline called science, a system of looking at the world so cutting that most men took the benefits and deplored the method.

WilDysE said science was a faith, just as mathematics was a hypothesis that three plus three equals six.

BranDer said it was obvious they

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had landed on a paradisaical planet. The two long loops of islands in the green sea joined by the steamcar bridges were unique and delightful. He thought this world should follow its own course and refuse any gift.

The Framers became importunate.

PeTersNel was persuaded to admit the Earthmen had made gifts in the past. "But it was always a universal gift. It must go to every man, woman and child on the world, for the common good. This is impossible."

Not so, shouted the Framers. It was the obligation of every man to vote every sixday. This was the thousand-year-old method of direct democracy, made possible for the entire world by the steamcars. Certainly every individual could receive a gift. What was it?

"The common good has not yet been determined," said PeTersNel and he would say no more.

"WHY are you so silent?" asked CaMila.

"I was wondering what you can give," said CosCros, "that will not accrete to a smart and greedy man in a sambat."

"Moonlight," she said promptly. "A world called Cor Caroli Three-eight was in so sluggish a time referent, we gave it a moon." She was lithe and brown and supple. The idea of her reaching out through a window and pushing a moon around a world . . . was not funny after all.

"Why give anything?"

"So we are not forgotten," she said, but this was the same sort of limited answer as moonlight for Cor Caroli Three-eight, because moonlight is not all that moons give worlds.

CosCros said, "I am proud of our achievements, the unification of mankind, the growth of equity in government along with the engineering skill to make it possible. At first there were boats, then little walkways and then stone bridges between the near islands. When it was time for pile-driving, steamdriven piles linked the skenes. The evolution of high-speed steamcars, with the knee-high wall in the center for directional stability and the smooth flanges on either side, made the will of the people manifest in a sixday. All this occurred in the incredibly short space of a thousand years. Who knows what the future holds? Do you?"

"Yes," said CaMila. She had drawn a thin line of red just above and below her eyelashes. "The demand outgrows the resources. The result is chaos and retrogression. A new balance is struck at a subsistence level of achievement."

"It's not an immutable law," said MariAn, "but there is a time imperative for society, just as the unstimulated child will not achieve optimum."

"We have no fixed obligation," said Jen. "Do you think we should go away and forget your world?"

"Or do we have some responsibility?" asked Fay.

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"I don't know," said CosCros.

"Then we must do the best we can," said CaMila.

CosCros had been sure of many things before he was convicted of treason, but exposure on the island and exposure to the Earthmen had shaken his certainties. They were not arrogant or self-righteous, but their undisclosed intention and their refusal to consider serious matters with due sobriety filled him with misgivings. They were hoodwinking the Framers into accepting a gift. Whatever it would be, he had the queasy feeling it would be for good. A morally loaded gift is always suspect.

It was instant voting.

PETERSNEL made the offer. The Earthmen would supply talking bracelets to all. Then every man and woman could push Yes or No on the bracelet. Their response would be sent by magic to a central repository and tallied.

WilDysE passed out bracelets to the Question Framers. "Is the sun shining today?" he asked. A box tall as a man showed the words on a screen: *Yes 52, No 9.* PeTersNel explained again and the Yes vote rose to sixty-one.

DasiKan protested that there was no assurance that everyone would vote. BranDer told him to abstain and asked, "Are Question Framers intelligent?" The Yes vote was sixty, the No vote zero and one abstention was noted. BranDer tapped the box and a number showed on the screen, the same as that on DasiKan's bracelet.

The matter of enfranchising women was bitterly opposed. It was resolved only when PeTersNel agreed the screen should show male and female voting. He was adamant in his insistence that every woman should have a bracelet as well as every man.

Finally GrisOngir stood beside the box and asked, "Should we accept the gift of the Earthmen?"

The vote was unanimously in favor.

GrisOngir said it was evident from the disappearance of the force barrier, that hands-across-the-stars were not infectious, and their volunteer should be returned.

CaMila said soberly, "Stay with us."

WilDysE appeared at the top of the stairs. "It is your choice, CosCros."

"Where does loyalty lie?" He was numb with decision. "I must go." He turned blindly and stumbled down the stairs. He wanted with his whole heart to stay, but he understood the peril of the gift. He foresaw the destruction of his world. He had no illusions about his probable success in persuading the Framers to his viewpoint but he had no option—he had to walk into the dull, mumbling jaws of futile endeavor.

He said goodbye to PeTersNel and BranDer and followed GrisOngir down the yellow alumina-fibered ramp. The afternoon sun washed the

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old castle walls to painted scenery. He walked with the Question Framers through the swarming men and women. The crowd stank.

He reminded himself, as he had so often before, that he was obligated to people and not disembodied ideas, that he must be wary of Humanity and Large Issues in order not to become a tyrant himself. He had made his choice. He wondered if the memory of his time in the spaceship would ache forever. He wrenched his thoughts back to the old problem of how gratifying it was to be concerned with abstractions about mankind and to forget actual men and women.

They went down the elevator and through the streets into the central district, past the steamcar terminus and the Implementation barracks to the hollow square where the Question Framers lived. Concordance Hall was at one end, along with clerical and bureaucratic support offices.

"I must give you a warning," said CosCros.

"Come into the anteroom," said GrisOngir.

"You know my mistrust of direct democracy and instant laws—"

"Which got you condemned to death."

"I implore your attention! Instant voting will be far worse. There will be no time cushion, no time for modifying thought, no time for—"

"You want to modify the will of the people."

"It takes time for all things—"

"It is time to vote for the purest democracy. This meeting will make official the vote aboard the ship. We will frame the question, 'Shall we accept the beneficent gift of the visitors?' It will be put out for vote on the steamcars tomorrow morning. No more nonsense from you. Wait here. I want your secret report on the monsters."

"You fool! Instant response means destruction!"

GrisOngir shook off CosCros' hand. His eyes were opaque. "I see it is time to reconsider your status."

III

HE WENT out and slammed the door behind him. CosCros opened it immediately. GrisOngir was cutting across the flow of the Framers to the Implementary station. CosCros moved with the crowd. He glanced back and saw a guard take position in front of the door. He walked briskly along the outer hall and out the back stairs. He had no food, no friends and no money, but he was his own man for the first time in more than three sambats.

He walked at his own pace toward the estuary. Null patches were less uncommon there and the brewery was famous. He idled along the docks, watched the labor crews finish work. They piled the last baskets of skeul wood and arardup kindling onto the carts. The skeul was even smaller in diameter than it had

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been—instant voting would reduce the pressure on the supply—Earthmen had used petroleum—none was available here. Concentrated energy was growing short. CaMila had been serious—why should the thought dry his mouth?

He entered a tavern displaying the brewery logo, a cloud of steam riven by a lightning bolt of discovery, and tore a beer privilege slip from the back of his patch. The proprietor was sympathetic when CosCros said he had forgotten his purse and slipped him a flatbread wrapped around a piece of fish for another beer slip.

He returned to the estuary in the gathering dusk, found a watchman and had him load a barrel of fish oil onto a boat that was broad beam and light draft. A single gaff sail was rigged without a boom. CosCros told the watchman the skipper was drunker than AhwRahn. The watchman said he wished *he* were, lit the lantern on the stern pole and cast off the mooring lines. A null badge worn with audacity had real advantages.

CosCros was out of the harbor traffic by moons-up, thanks to the favoring wind and quiet sea. The wherry had a low freeboard and belonged on the river or in the harbor, but it was loaded with bundles of arardup and was a safe enough coastal craft. CosCros sailed half the night before he saw the waves on the causeway to Iloura, a straight line of pale breakers. The steamcar bridge crossed the deeper water on pilings. He tied the wherry four boatlengths from the Ilouran shore two hours before sunrise.

It was not too late to change his mind.

He gripped the tiller until his fingers hurt, trying to squeeze understanding from apprehension. Were the Earthmen guilty of malicious mischief? How could men of good will sponsor disaster? Democracy is responsibility and AhwRahn will always make beer from grain and worry about flatbread later. Society is based on restraint—without restraint anything is immediately possible. Drowning every other person would leave more for the others—solution unacceptable. He groaned and looked at the loom of the land in the night.

ILOURA was a spiny island twice as long as Crux was wide, a skene with a small population and scant resources. The north ring began at Iloura, the south at Crux. Here was the single bridge north and here he could buy the most time. The vote could not be quickly ratified until the steamcar line was repaired. Buy time for what? Second thoughts? Rebellion? Who will rebel against immediate gain?

He knocked in the barrelhead and poured oil on the arardup. It was still not too late. He could change his mind. He could return to the spaceship. Let the world take care of itself. Who was he to read the future and find disaster in instant democracy? He swung the bobbling stern lantern

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inboard. If the Earthmen were dedicated to longterm good, it was presently cold comfort. Maybe he was wrong. Maybe he was not. He smashed the lantern into the cargo.

He swam ashore because he had been wrong. He should have set the fire from the bridge. The arardup caught from the flaming oil and volatilized into a burgeoning flower of fire. He dove into the black water. He pulled himself onto the rocks and was aghast at the intensity of the blaze. The flame gouted high over the bridge. He crouched to avoid the searing heat. The piers were burning, so was the cribbing and so was the bolted wooden track.

He climbed to a cart road and loped along the shore. He heard voices ahead and hid in the dark while men and boys passed him toward the glow in the sky. He turned downhill to a sheltered bay, avoided the houses and found a skiff pulled up on the sand. He rowed to an anchored fishing boat, sharp at both ends, and sailed out of the bay on the light wind running ahead of dawn.

The boat had provisions and water. He coasted well offshore for the day and night and at midmorning he saw the hills of Kuttai, the first skene of the eastern loop. He went ashore at twilight to refill his water cask at the foot of a sharp ravine. The steamcar trestle crossed above. There was a rusty universal wrench aboard the boat and he spent that night removing bolts from the trestle track. He sailed at dawn and rounded the tip of Kuttai before noon. Bridges marched to the horizon over a chain of low islands. He fished the inner sea until night fell, then set out for the western skenes.

He was becalmed in the morning. The sail did not stir for three days. He chewed the fish he caught to supplement his water. The inner ocean was glassy. He fell into a condition of somnambulant contemplation—and when the wind stirred again, old facts had assumed new relationships.

The spaceship had to be old. The main fabric showed signs of age and repair, though individual parts were new. The folding chairs for the Framers were sparkling new. The rugs covering the carpet could have been made on his own world. The food was exotic, but he was sure it was not Earth food because the words were not in the English language. The bed closets were more than individually different—the sand-orange of BranDer's, the lines of green on green on green of BarBarA's, WilDysE's aqueous blue-gray, Fay's overlapping white scales. Of course the ship had visited on many worlds. How long did it take to wear a hollow along the alumina-fiber ramp?

Men and women on Earth had five fingers to a hand and everyone else had six. Other pictures showed one navel per person. They had peculiar skin shades—they might go through color phases—and the starcrew could have been chosen from a single

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variant race. More women than men? Strange worlds surely presented strange dangers. English as a common tongue? Because of its wealth? Or because each crew member spoke a different native language?

The starmen were not Earthmen.

COSCROS landed on Derra, replenished his water and lodged a timber across the track in a tunnel. He stole food from an Implementation kitchen and was nearly caught. He sailed north again.

Between Kareelpa and Nargan he sawed through a flange and filled the kerf with sawdust and fish oil.

He undermined a boulder and rolled it through a concrete track section, where the graded way cut a sidehill on Waranalin.

He was always tired. The demands of his self-imposed task shut out fruitless speculation about aliens. He escaped capture by a ten-oar boat only because a fogbank gave him shelter. He turned east and sailed across the widest part of the inner sea, careless from short sleep and food. He was caught in a storm and driven ashore on Damanami.

Surf smashed the boat to firewood on an open beach. He hobbled half a day through saltgrass and swamp. The purple bruise on his thigh seeped blood but the gash from his jawhinge to temple was shallow. It opened again when he stumbled at the door of a basketmaker's hut and thumped his head on a worn chopping block.

The bed on which he woke was covered with rushes over a wooden frame. His arms and legs were tied with withes to the corners of the bed. An old woman was weaving a split saltgrass basket.

"Water," he said and she paid no attention. His throat was tight fire. His mouth was swollen shut. "Water," he croaked.

"So shrivel up," she said.

He tried to speak again and got the dry heaves.

"Choke, renegade," said grandma.

He contracted his body in fury. The bindings held, but the old bed did not. It collapsed and he lurched to his feet. He swung the headframe into the air.

"Cut my feet loose, mother." Free of the bindings, he rinsed his mouth and drank sparingly. "My boat was wrecked. Droos and badge ripped off. Why renegade?"

For an answer, she held up her left arm. A broad band circled her thin wrist. It conformed to the bones and tendons, except for a rectangular section thicker than the rest. One edge of the rectangle was straight and white, the other wavy and black. The surface was washed with colors that changed as CosCros stared. "Give it to me."

"Can't cut it. Won't come off."

"What if I cut off your arm?"

"It defranges," she said triumphantly. "That means it busts into powder. Been hiding a sambat, hah?"

"Where'd you get it?"

"At the polls. You push your hands in a box. If you got a stump

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you push it in, too. You got no arms, you go to Damanami and they put it on your ankle. You be a basket case, they stick it on your neck. You got no neck, renegade, you don't need one."

"What about nulls?"

"They don't send Implementors after you, is all.'

"I thought the steamcars were down."

"Not enough to stop the vote. 'Should we accept the ben-iffy-sent gift from the stars?' Ninety-nine point seven, Yes. The starmen carried the boxes all over. In the comfort and convenience of your own home, renegade. No more miserable walk every sixday. No more fines when you're sick or—"

"Attention!" said the bracelet.

"Yessir," said the old woman. "I'm here. I'm listening."

"Your Question Framers ask the will of the people. The question is, should the steamcar crossing at Bublara be elevated for the common good?"

"Dearie me, yes." She pushed the white edge. "Where's Bublara?"

The bracelet spelled out: *Thank You. You Have Voted.* Then it added: *The answer is 86.4 per cent Yes. 88 per cent and gaining. Remember, you have one hour to respond before your order is delinquent. There is one more question framed for today to be answered one hour from now. Should the skene of Tintenbar be allowed to increase the reward for the capture of the traitor CosCros? Such reward to be an effective addition to the bid price? I will repeat the question—*

"Where's your old man?" said CosCros.

"He died."

"Two dirty bowls. That droos on the peg." He took her throat in both hands.

"Gone to town," she said. "They don't pay much for renegades, but we need every little bit we can get."

He dropped her onto the remains of the bed. She glared up at him. He put on the droos. "I'll bounce a rock off your head if you stick it outside." He ran to the swamp and when he was hidden from the hut, circled back to the footpath. He found he was on an island of firm ground. A rotten log made a bridge over the last of the swamp. The path crossed into leafy third-growth skeul. He crossed the log and entered the bosky forest. He heard the old woman grunt and turned in time to catch a billet of skeul at the base of his skull.

WORDS faded in and faded out. "I'm here, I'm here. Pay money for CosCros, yes, yes, yes!" His head swelled and diminished. His eyes focused and faded. She had dragged him between two trees, tied his feet together around one and his arms behind him to another. She was happily weaving more peeled bark into rope and had knitted him into the greenery by the time two Implementors and her husband came down the trail.

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They cut him loose, hobbled his legs and walked him to the village. "Without exception," said the Implementor and forced his hands into the alien box. The babble of the bracelet drove his ignominious failure through his head like a bolt. He was hauled in a cage on a cart to the steamcar station. Grandma went along for her reward. She amused the guards and they pointed out places of interest on the trip. They showed her the scarred hill where the starship had settled to manufacture bracelets and boxes from rock and seawater.

CosCros' bracelet crepitated with black on purple. The guards' flashed stalwart green. Grandma's blipped scarlet and orange with avaricious joy. GrisOngir's bracelet was malicious yellow when he stared through the bars at Crux, spat and turned away.

The amphitheater was being enlarged when CosCros was put into a handsome new cage at Tintenbar. Admission to view the rebel was to the floor only. Interest was so great that guards cleared the arena twice a day before feeding time—and if the public wanted to view the mad arsonist at his food another admission was charged. An enterprising potter cast souvenir mementos of the infamous CosCros meeting his possible fates, old-fashioned paper votes were sold to choose the most beautiful maiden, a company of fishermen brought in a record vortvert with twelve legs to be kept in a shallow tank until needed.

THE opening ceremonies were well worth the doubled admission price. The amphitheater overflowed. The notorious CosCros was paraded around the arena and everyone got a good view of his evil features. He was shown the several stalls, three on either side of a tall striped post with banners on top. When the track debouched at the post his head would be driven into his shoulders.

One stall held the maiden. Another a pair of snarling irax on light chains. The third was filled with bladders of excrement. In the stall beyond the post stood a man with a whip. Next came a stall of bitegrass with serrated edges. The last held a cook and his coals plus succulent viands. One of the stalls would be changed every day. The trip device on the bottom of the cart automatically released the prisoner from his bindings in every stall—but not at the post. The switches in the maze were controlled by the weight of water and windmill-driven cams—entirely at random. Betting was skene-controlled. Get your program here! Watch out for cutpurses! A fine show . . .

CosCros stood on the cart, his hands locked to a waist-high bar. Dignitaries were introduced. They took their places at the rope. To a ceremonial flourish of drums, they pulled the cart up the amphitheater slope. At the top the hook was disengaged and a nimble-footed boy dragged it down to the arena, the

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pulley whirring, to be ready for the next day's ride.

The cart was trundled to the launching platform. A pin was pulled and the bar swung forward, locking the prisoner prone, his chin on a rest.

"Do you have any last words?' asked the Ceremony Framer.

CosCros raised his head and shouted, "Beware the Question Framers—" but the roar of the crowd drowned his voice.

The Ceremony Framer pulled the long lever and the cart rolled down the incline. It switched left as the drums beat, was masked by potted trees, zagged right and burst into full view through a sheet of water falling down the artificial mountain. It slowed on a rise and stopped on a turntable. It chose one of seven tracks and eased down into a tunnel. It burst into view, rocketing diagonally across the slope. It turned on a banked curve near the bottom, spent momentum up the hill and came to rest on an elevator that took it nearly to the top again. Off and around, it ran directly for the post, spun on a pivot, turned right and ran gently toward the irax stall.

The crowd broke into spontaneous applause. It was the finest execution ever devised. History was in the making. And there would be days and sixdays of this delightful celebration.

Silent as a cloud the pale gray spaceship settled onto the irax stall. The door opened. The yellow ramp extended. The cart ran into the entryport and the ship lifted. The empty cart fell tumbling through the air and hit the bladders. The maiden shrieked. The ramp sucked in and the door shut. The crowd screamed rage. The spaceship lifted, twinkled, dissolved and was lost in the sky.

"What took you so long?" said CosCros.

HE WAS dizzy and belligerent. He had given up friends when a friend tried to kill him and here he was again, trusting people. The star men surrounded him, PeTersNel, MariAn, WilDysE, Jen, Fay, BranDer, BarBarA and CaMila and CaMila and CaMila. She had drawn a tawny dot in the middle of each navel. He sighed, looked up to meet her laughing eyes and was overwhelmed by a different sort of dizziness.

"You had to find out for yourself," said PeTersNel.

"You're not Earthmen," he blurted.

CaMila said, "Told you he was smart."

"We're each from a different world," said BranDer.

"Replacing Earthmen who died long and long ago," said Fay. "Taking their jobs and their names."

"Honor and continuity," said MariAn.

The skene of Tintenbar shrank in the screen. The other islands drew in from the edges until CroCros could see the whole double loop cast in the sea, blurred by clouds. The picture

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stayed as the spaceship followed the world's rotation at a constant height. CosCros cleared his throat.

"And now?"

"Now you make a choice for your world," said PeTersNel.

Just as he had seen them the first time, they were the contradictory people again. They were joy and sorrow, challenge and resignation—they were reason and emotion inextricably mixed. They were men and women—mankind.

"It has to do with time?" said CosCros. "The real Earthmen—how long to make steamcars?"

PeTersNel understood. "From a stationary steam pump built to lift water, to an engine that lifted men to their single moon, a hundred and sixty—plus some—years. Not four lifetimes. It took them less than two lifetimes more to build this ship."

"The impetus must run ahead of resource use," said Fay.

"Otherwise we crest and falter and fail," said BarBarA.

"How did Earth make it?"

"To the stars?" said Jen. "Raging at the finish line, choking and screaming, running through the forest butting down trees, mad, bloated, horrid—and triumphant."

"What is the choice I must make?"

PeTersNel said, "Keep in mind that the bracelets should interrupt the long downhill slope. The curve will break sharply and, in reaction, surge up and high."

"The tempo will be changed for all who live," said CaMila.

"The bracelets are subtle things," said WilDysE. "They communicate, reflect emotion—and they defrange at death." His eyes were hard and compassionate. "Or they can be ordered to defrange and cause death."

Too many people? Drown half the population. Or only one out of three? More food, more houses, more skeul for the rest—and how many would survive instant democracy? Kindly kill them now instead of letting them starve? He was suddenly sick with responsibility. "What is good?"

"We don't know."

"No," said CosCros. He looked at them all. "We've done enough. No!"

CaMila said gently, "Each of us made the same choice."

"And the Earthmen?"

"The most advanced race—"

"They never made that decision for another world—"

"We follow their pattern—"

The screen showed the floating ice of CosCros' world. They were leaving. The infinity symbol—of English notation—was fading into the bright mottled ball, floating serenely in black and star-pricked space.

"To save Earth, they defranged two out of three."

CosCros shuddered.

"All we can do is the best we can do," he said. He was not satisfied. The vaulting spirit, the use of power, passion and impassion all came to a dull—and blazing—irreducible.

"Keep trying," he said and joined the crew. ★

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QUARANTINE

Every prison wall poses this treacherous question—which side is the outside?

DORIS PISERCHIA

THE television set went first. Ruining it took me a long time because it was imbedded in the wall.

The generator was due for a clobbering, but it had to be spared until I found out what the weather was like. I vented my frustration on the communications board, tore out wires, smashed tubes, made pulp of the earphones that had relayed no sounds for years.

The next to die was the library. Into the incinerator it went, half a shelf at a time.

I killed practically everything in the house that represented a barrier between me and the world.

After clearing away some of the debris in the living room I set to work on one of the walls at a spot

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where there was supposed to be a window. The surface was so hard it broke three drill points right away.

One of the points finally dug in and I settled down to some steady labor. It had been the right spot to start drilling because the point rammed through and glass tinkled. That sound of breaking glass made the beast in my head go wild. For a few minutes I was a madwoman. Sick with the longing to escape, I thrust like a maniac with the drill. All my weight was against it as it passed beyond the window and struck something hard—then the drill slipped out of my hands and I fell to the floor.

I couldn't believe it. There should have been free space beyond the glass. The drill ought to have gone on through.

Scrambling up, I jammed my nose against the hole and sniffed like a starved dog. Did I smell fresh air? Christ, was the wind blowing out there?

By the time I drilled a square of holes around the window I was pooped and quivering. It took a few minutes to knock out the square with a hammer, then the glass, then . . .

I came up against another solid wall. It was impossible, but beyond the glass was another plastic surface harder than the one inside.

The second wall was stronger than any drill point in the house and it had no business being there. Somebody had been pretty clever. They had walled up my house without my suspecting they were doing it.

I sat in a chair and stared at that shiny square. No drill nor any other hand tool would ever make that wall yield. No matter. I would wait until morning (a figurative expression) and then I'd blow the wall away. I had plenty of powder. Chad used to work in munitions.

SLEEPING was easier if I lay so that the glare of the light hit me directly in the face. As I stared at the bright bulb I congratulated myself for having decided to get out. It wouldn't be bad. At first the thought of the plague had paralyzed me so that I was afraid the two needs would grip me forever in an emotional crossfire. I had to have some space about me and I had to avoid contamination in case the bug was still out there. But it couldn't possibly be. Such a long time had passed.

There were thousands of tracts like this one—a lot of people.

We locked all the slum people out and quarantined ourselves away from the sickness. The slummers and their rats were responsible for the plague in the first place and it was their misfortune that they couldn't finance their own safety. They had to go on mingling with one another and they either lived or died. We on the

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other hand had money to burn and we used it to save ourselves. Our houses were made completely self-sufficient. We planned to do a little work and put the finished products in pneumatic tubes that would transfer everything to a storage place where it could be picked up when we all came out. The automatic dispensers contained plenty of food and we didn't need doctors because we knew internal medicine and surgery. Communications systems were installed in each house and in the beginning we called our Congressmen daily. We were sorry for the people on the outside but felt they should have worked harder and earned more and saved.

Things changed. After the first year had gone by the Defense people suggested that a team go out and look the situation over. The Vice President thought it was too soon. Another year went by and again the suggestion was made. No one seemed to think it was a good idea. They said wait. We did. We waited for a long time and eventually we stopped talking to each other on the radios.

Sleep was slow in coming. After awhile the light hurt my eyes. I closed them and endured the pain of a headache, tossed on the bed, tried not to think of Chad, then decided to go ahead and think about him.

I should have thought more about him in the beginning. Who was it wrote about: . . . *what might have been?* Such was the star by which men set their course.

Chad is--was--insane. Which tense applied?

"There are just the two of us now, pet," he said. "I suppose we should thank God that we didn't catch the bug, but how would you like to be stuck in here by yourself? Well, aren't you going to answer me?"

We spent that first day watching television. It was as it had been in the days after we were married--with him looking at me most of the time and not at the screen.

"Remember that old passion I had for cooking?" he said. "Now that we have so much leisure time I think I'll start giving you a hand in the kitchen."

It wasn't quiet enough in the house. I tried keeping the TV off but whenever Chad had one of his pacing seizures he turned it back on. Occasionally I switched off the air-conditioning, but then he complained about the stuffiness. He was never slow to complain.

"Why do we have to pretend every day from one to three o'clock that each of us is alone in the house? It's weird. I get depressed when I can't see or hear you. I'm beginning to feel as if I'm locked in a big tomb."

Later he said, "You're kidding. Why do we have to extend our separation periods? Two hours are

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plenty. And I disagree with your theory. Mental health doesn't depend on solitude and silence. Human beings aren't—oh, hell, it's just that I don't want to be completely alone. I've grown jumpy since you moved into a room of your own. I have the feeling that all the substance is being sucked out of the house, as if I were being drawn into a vacuum where there's nothing but me."

At one time he was in love with the library. "I swear the damned place is like a museum," he said. "The second I go in and shut the door behind me the rot sets in. Why can't I leave the door open? I don't make any noise. Besides, the place *is* a museum. All those rows of microfilm boxes are like the eyes of history staring at me. What has become of us? What are we doing here? We made a mistake, pet. This is no answer. Now wait a minute—calm down. I didn't say anything about going out."

There was the radio. "Mind if I make a call, pet? To whom? To anyone. Okay, okay, I've forgotten it already."

Later: "Whoever makes the first noise has to reward the other? My God, that's a kid's game. Hey, wait a minute, I'll play if I get a reward first. No? Then I won't play. What's the matter with me, anyway? Have I got bad breath all of a sudden? Surely you can't be enjoying yourself. I never see you, I never hear you—what is so fascinating about being all by yourself?"

I should have thought of him.

"No, I don't want to play any more. No, I won't lower my voice. I like the sound of it. I like any sound. I wish the place were overrun with mice. I wish we had a cat or a dog. So help me—oh, hell, I'm sorry, pet. For God's sake—I said I'm sorry. You needn't act like I've burst your eardrums. What do you mean I'm disintegrating?"

HE BEGAN playing his phonograph. As if it weren't bad enough, he selected the worst pieces to play—hop junk from the bebop era.

"You'll just have to move," he said. "My room is at the far end of the house, so you're the one who will have to put distance between us. You don't have to, you know. You could come in and listen. It would do you good. We could dance. How long has it been since we've danced? Or touched one another? Don't you get hungry for the touch of skin? Here, love, take my hand. All right, don't take it, just touch it. Touch, touch, touch me. Oh, goddamn, I haven't got leprosy, I only want to be reminded that I'm alive. The senses have to be stimulated or you're dead. I don't want to be dead standing up."

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He had to stop following me. My pressure point had been tapped and from then on it was a choice between using defense mechanisms or popping a capillary.

"Why can't I come in?" he often asked—too often. "What are you doing in there? It's so quiet. I can't hear anything. Please open the door. I know you're only sitting there. Let me sit with you. I won't make any noise, I promise. We'll sit together and think quietly, or maybe we'll chat about something. Honest to God, pet, I don't think I can stand this much longer."

After one such display he went back to his room and began beating his drums.

"I'm doing no such thing. For God's sake, I don't own any drums. And I haven't played the phonograph for days. I'm merely sitting in this damned chair staring at the damned wall. What else is there to do?"

He never stopped drumming.

"What the devil is that? Oh, come on now, what do you think you're doing? I tell you I'm not pounding drums and I haven't worn cleated boots since my school days. You can't be serious. The house is big enough for us both to enjoy a little peace and quiet without this sort of thing. I'm warning you, pet, that insulated stuff won't come down once it goes up. You seal those borders and you'll have a house permanently divided into two sections. Oh, God, what's happening to us? What are we becoming? Do you hear me? Don't you care? Damn you to hell, go ahead and do it. Thanks for leaving a door in the thing. Once in a while I'll come out and see if you're still alive."

He had everything he needed on his side and I had all I needed on mine. Or so I thought.

I might as well have been in Africa and the Rose Bowl simultaneously. The drums, the bebop and the boots. The drums. The bebop. The boots. The son of a bitch. The maniac.

Was that a scream?

"I can't work! Sometimes I think it would be a good thing if instead of making dynamite sticks and caps I made a bomb and blew up the whole tract. I can't figure it out. Something's happening and I don't know what it is. I'm starving to death for substance. I wake up from dream conversations and I want to shriek because they aren't real. I think of bodies all around me and I want to reach out and grab them. I want to strip naked, have an orgy, wallow with a hundred women, but most of all I want to hear them. I want to hear something besides my own heartbeats. Please, please, please, please, please—"

Something was making a din so terrible that my brain cells threatened to shatter. How did you track a

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noise to its source when it was everywhere around you? I did the impossible. I tracked that sound from room to room until I came to a small opening in a thick wall. There was the source of my agony.

The sounds, the screams from far off, the thumping from the other side of a door that was no longer open. Somebody had been right. Nothing short of dynamite would break that sealing.

Defense mechanisms were impregnable.

IN THE morning I went back to work on the wall. It took hours to drill indentations deep enough to hold the caps, hours that rubbed my hands raw and broke my back, yet they were hours sublime because for the first time in years I was doing something that had a sane purpose.

Not exactly as in Jericho, a section of the wall came tumbling down with a loud crack of dynamite.

My claustrophobia was driving me wacky, making my hands fumble, putting a watery sensation in my knees that sent me to the floor a half-dozen times before I managed to get my head through that hole.

I spent five minutes running through my vocabulary of profanity

★ ★ ★ GALAXY STARS ★ ★ ★

"I loved sf as a child and I still do," says Doris Piserchia. "I write it for fun—and because it lets me say anything I please. Sf is so much less restrictive than the mainstream—"

Nevertheless, it was not until her late thirties that Doris became a writer. We asked how she finds the time to keep it up, now that she has five children.

"For me, writing is possible only when I stick to a strict schedule. I start working in the morning as soon as the last child gets on the school bus. If I'm facing a deadline or doing something especially interesting, I'll put in time in the evenings as well."

Not only has Doris a busy life; she has an exceptionally busy mind. Consider her goals, and her views on sf's future.

"I intend to make women prominent in my writing. This is a difficult thing to do, since I'm as conditioned as everyone else. In literature, females have few lofty motives or sexual musts, and since writers learn from reading they tend to write in the same vein as others before them. Besides, putting down on paper what I know so well in my head is like superimposing myself on a bull's-eye for readers to throw darts at.

"We had the Nuclear Age, and now it is Minority Groups time. We're all saying, 'Look, I'm as human as you are.' Whether or not we're listening to each other is questionable.

"But science fiction can handle the gripes and the dreams of everybody. It is a wide-open field, and that's why nearly all writers will probably land in it sooner or later. More than one writer has claimed that sf is the literature of the future . . . it may very well turn out to be true."

Doris Piserchia's first book, MISTER JUSTICE, came out on the stands in May of this year. A second book, STAR RIDER, will be published by Bantam in the near future.

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because of all the times to break out I had to do it in the dead of night. There was nothing to do but wait for morning.

Morning never came. It might have helped if I'd gone to bed and rested. I sat in my big chair with my eyes on that hole and waited for the sun to come up. Patiently I waited for my beast to die. There must be space, beautiful emptiness that drained the pressure away from one's bones, wonderful sunshine that sped to infinity, vigorous wind that first belted and then fled, little drops of rain falling from far overhead.

I never once looked at my watch but eventually I realized that if morning were ever going to come it had already come and was out there beyond that hole. I still saw nothing but blackness.

A flashlight was no good, showing me only the cracked sidewalk the shiny surfaces on the nearby houses. A quick rummage in the basement to grab up a couple of flares and a beacon—then I crawled out through the hole and walked up the street. I had to move with caution to avoid the holes made by rain and wind over the years.

I stood in the middle of the street and set up the beacon. It was a good view I got of whatever that thing was where the sky should have been. Because of the condition of the streets I knew it had been put up recently. It was an endless length that glinted in the beacon's light like a sheet of solid steel.

It was everywhere overhead. I know because I tracked that lightless cage from one end to the other and back again, and I didn't quit until the flares were gone and the battery in the beacon was as dead as the chunk of heart in my chest.

Now I sit in my big chair and do nothing. The hole in the wall is sealed because a crypt isn't a proper crypt when it opens to the outside. There's an outside beyond the hole but it is just a bigger crypt and all that quiet and darkness is more than I can take. As long as I have to be buried I'll take it small.

I may be the only one who knows the secret. They survived out there, and now they've giving us back in kind. We locked them out, they have locked us in.

They are more humane than we were. They haven't contaminated our air or cut off our food supplies. We will go on living until the last one of us is gone and then maybe they'll stop building things on top of us. One day they will excavate the whole works and start all over again.

I sit in my big chair and worry. My sources of diversion were destroyed by my own hand. I know that one day I won't be able to control my longing to talk to somebody. The only one around is Chad. ★

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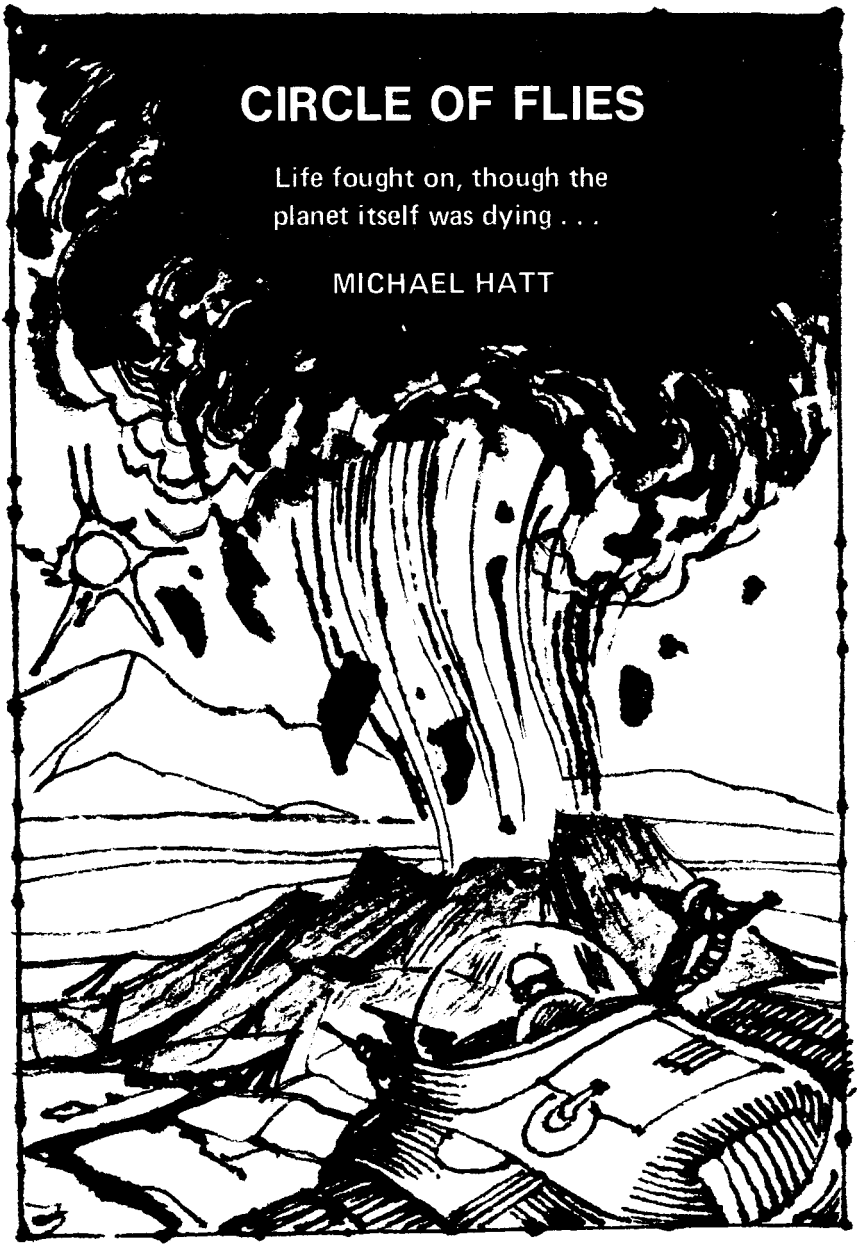

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I

From *The Manual of Ships and Units of the Fleet* Fleet-Doc 1-G29B, 7th ed.

551st FLEET EXPEDITIONARY FORCE

Unit Symbol. Center: confederate sunburst with crimson cross affixed mid-seal. Astride: crimson Andromeda Firebird at unfurled salute. Below: crimson Islamic scimitar with scabbard hung.

Commission. All-purpose reinforceable armor-infantry regiment; male anthropoid staff; ground force assignments.

Decorations. Confed Cit for Unit Valor (2); Grand Mershiesh Seal for Spirit of War (1); Flt Cmpgn Star for Gallantry (5); Unit Cit, Terran Order of Glory (3); Courage Colors (Terra, Pan-Mohshu, Mershiesh, Gif.)

History and Campaigns. Commissioned 6102 S.C., formerly the 23rd Ancillary Armored Regiment Pan-Terran Forces; first assignment aboard Fleet Cruiser *Chardunmay* with additional non-Terran staff; first commander Capt. Hoisie Maighan, hero of the Battle of Mabrit. Campaigned at Beta Chevrops against the Longside Pirates; at Mershiesh in the Battle of Shuus against the Imvir; at Tri-Mepo in the Battles of Ixquilovir and Baidn against the Imvir Remnant and Kilton Pirates; at Zetha in the Battle of the Mouth of Brythis against the Gutu marauders. The Protective Directory of Zetha was militarized in 6278 S.C. and mandated to the Terran Board; at the same time, the 551st FEF was temporarily assigned to the Terran Fleet. The unit performed reflexive-protective duties until 6293 S.C., when, in a strange circumstance . . .

HJEK was climbing over great rocks, up a slope rising to a plateau. He stopped his climb and listened carefully. The red earth of the desert was still and windless that day, and there were no sounds but those made by living things. He recognized the whir and rumble of an approaching *f'gaiin.*

Below, at the base of the slope, he saw it move into sight, fat and shiny. It jiggled and meandered, steering around the bigger rocks that it could not climb. Its sound was a whine like a baby's hunger cry.

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Hjek knew that these things had watchful eyes and could see a great distance. He crouched, grinding his heels into the dirt beneath him. Slowly he laid his long-bladed sword and his spear over his lap and leaned his elbows on his knees. He minded himself that he must be like the *bluk*, the giant rock sloth. He had even seen a *bluk* when he was a boy. Now no one saw them. Like every kind of great hunting beast, they were no more. The Old Gutu remembered how the *f'gaiin* had slaughtered. No hunting beasts and very few Gutu remained.

Hjek himself was a great warrior. He had stamped out the teeth of seven of the *f'gaiin* that he killed. He was clever and could make the Old Gutu laugh and nod their heads at him, and his body and spirit were strong so that women admired him. But Hjek was right to fear the strangers. They were deadly, especially the ones that wore gray and rode inside the shiny beasts.

The thing below picked its way all around the slope. Hjek lowered his inner eyelid, clouding his vision. He could still watch the form of the thing moving. In his mind he thought of his new woman. She was young and ardent. He dropped one hand to the ground and scratched the warm dirt and wondered if she would soon be fat and let out a boychild. He had made his first woman fat, but then the strangers had caught and killed her. It had been a very bad thing. It had made him weep and for many days his anger had been too great for even his brothers to come near him.

Hjek raised his inner lid. The creature had stopped almost directly beneath him. Tightness filled his throat and his body tensed. But the thing moved on and Hjek relaxed and thought that it looked like a big bug. The comparison pleased him. He smiled. And then Hjek expanded on his idea. He made a picture in his mind—in it the creature looked exactly like the awkward beetle which sometimes fell from the elephant trees. Hjek had crushed some of these under his foot. In his mind he imagined his foot crushing the thing below. He was happy with himself and laughed. He would go home and tell everyone his idea. They would laugh, even the Old Gutu. Hjek was clever. He laughed so hard that he closed his eyes and his body rocked with mirth.

When he opened his eyes again, still aching with joy, he saw that the creature had turned onto a ramp of slag and was climbing the slope. It had already come very close to him.

HJEK was seized with terror, for he could feel that the thing's eyes were on him. He jumped to his feet and searched for the best way to run. Near his head a rock shattered and splinters flew into his face. Hjek slapped at his cheeks and bloodied his palm. The creature was drawing much closer, screaming in its climb up the slag, and its guns spoke.

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Rocks shattered and sprayed Hjek with fragments each time it fired. Suddenly Hjek's body was thrown down on the rocks. He felt a terrible burning in his bowels. He scrambled up and pulled his body over the nearest rocks.

Everywhere he went rocks broke up and showered him and he could see blood gushing from his side. The thing had thrown something into him. He was hurt badly.

Hjek reached the crest and crawled onto the plateau, but the creature had made the easy climb up the slag and bounced over the crest just behind him. Hjek started to run away at an angle. In the center of the plateau he saw a tall column of rocks the thing could never climb. He opened his lungs and ran as hard as he could, lowering his inner lids so that his eyes did not burn.

The thing screamed behind him and the guns started to fire. Hjek opened his eyes and saw the ground before him blowing up puffs of dust. And then he was struck. A chunk of his thigh flew away. He was hit in the right shoulder and stumbled. He was hit three times over his body, each time hard, and he spun round and dropped to his knees. He saw the creature grow large, flames rippling on its face.

Hjek was close to death. He could not draw his breath and his body felt broken. His inner flesh seethed. He stumbled to his feet and tilted his face to the sky, wanting to gasp, trying to call to the sun. Anger seared his brain. He cocked his spear arm and pitched his whole body. His spear flew away and then his lungs expelled their air and flecks of blood and a thin piercing scream—the death scream of his race. Hjek's body shuddered and collapsed.

The creature stopped near the body and the top popped open. An animal that looked like Hjek jumped down. He was like Hjek, but he was smaller and his body was covered with gray fabric. He wore the jeweled insignia of a commander of the fleet.

Hjek's flesh was the color of his world and so he had worn nothing at all. His body was spread-eagled, face to the sun. His eyes were open but saw nothing. His sword lay behind him, fallen from his hand. The *f'gaiin* stalked cautiously around Hjek's body. He stopped. With both hands he tugged at the sword and dragged it to Hjek's hand and dropped the pommel into Hjek's palm. Hjek, of course, did not know that he had been done this kindness.

II

ZETHA. Fourth planet within the star system Omega Medusa. Discovered 6248 Sirenian Calendar by Gudwar Zetha, contract explorer for the Galactic Confederacy. First GC scientific expedition 6260 S.C. under Amrer Xz and K.K. Patrick. Zetha is best known as a source of numerous rare minerals, some essential to ship hull

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construction. It is a self-terminating planet due to an aberration in its orbit and axis. The axis inclines sharply toward its star and Zetha follows a reducing orbit, which draws it into Omega Medusa. All present life forms will perish under increasing temperatures. Also, stress on the planet creates violent geologic shifting, which may in time cause the body to break up in space. The southern hemisphere of Zetha is largely frozen to the 36th parallel. The central belt of the planet is marine and has a complex marine ecology. The terrestial ecology is concentrated in the northern hemisphere, which is a single continent to the 40th parallel. The polar cap to the 12th parallel is hot and arid. A single people live on Zetha, primarily in desert caves and in the surrounding forests. They are a primitive humanoid: *Homo Gutu Zethanus*. A cousin species of sub-People hominids dwell in the dense forests. They are commonly called Zethans and were mistakenly classed as a People with the Confederacy until the error was corrected in 6282 S.C. In 6275 S.C., Zetha was entered into the Galactic Confederacy as a non-participating protectorate with a civil directory. The directory was militarized in . . .

From *The Little Handbook of Planets*, a pamphlet by Dr. Horace Amayn Woo

ROBINSON closed the Gutu's fingers over the swordhilt with his foot. They cared to die with their weapons gripped. He knew much about them. For seventeen years he had chased the Gutu, hounded them, butchered them in the desert. And for seventeen years he had watched the sun come closer. The heat of this world had sucked him dry. He was a cinder, spare and lean.

Robinson snapped up the visor of his helmet and squinted. He stood on the tenth parallel. The searing sun was overhead. It was early morning. So bright was the light that he could not distinguish the timeless still shapes nor the dull red of the desert. He pulled the screen back over his eyes.

The commander's skin was dark, colored by birth by the mixing of his ancestors and blackened under the Zethan sun. His hair was a tangle of black wool. His eyes were blue so dark that some men thought them black, and his gaze had power that pierced like a stake through a man and pinned his soul to the wall. He was not handsome. The hawks and eagles of his mother Earth resembled him.

The warrior lay on his back staring at the star to which he prayed in life. Already the reddish irises were faded, the eyes dry. This was a big one. Robinson leaned over the corpse to

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estimate its length. Over eight feet. He jerked back his head. The odor of blood mixed with the contents of the Gutu's bowels evaporated from a large hole in the warrior's belly.

Robinson kneeled by the Gutu's head. It had the flat face of its race, a heavy browridge and shallow forehead. Robinson reached under the skull and gripped a knot of black hair. He tugged, turned the head. Twined in the knot of hair were colored strings, beads and human teeth. This one had killed a half dozen or so offworlders. Robinson thought he recognized the Gutu, a rogue warrior involved in perhaps twenty raids in recent years. He pulled a thin-bladed knife from his boot and sliced through the hair at the back of the head. These souvenirs brought a thousand visigulls from cargo sailors who in turn got four or five times as much offworld.

The heat prickled his skin. The moisture fried from the flesh and the flesh stung. He had to go back to cover. He walked to his tractor, threw in the souvenir, then climbed the side and plopped into the cab. He reached overhead and drew down the bubble, locked it in place. The refrigerator blew cool air over his legs. Robinson sighed and reached for the microphone. But when he keyed the transmitter, the emergency power relays shut down the cooler. He kicked the floorboard to switch on the refrigeration again.

Commander of a yard full of junk! The 551st with its record of gallantry was fit to be scuttled. It was an undermanned gang of assassins, staffed by the fleet's unwanteds and equipped from a scrap heap. Robinson's vehicle was sixty years old. They had plucked it out of the garbage and sent it to him for service—and it ran only because he paid out of his pocket for parts from private dealers and did his own maintenance. He was constantly afraid for himself and his men. Their creaking clanking dog carriages had broken down in the past and Robinson had the memory of what two days becalmed in the desert could do to a man.

Robinson gazed a final time at the body. You are a fine animal, he thought, but it's good you're dead. They looked so much like Terrans. They behaved in many ways like men, but their brains were small, primitive. Once caught in the open they were easy prey to the genocidal machinery that Robinson commanded. Robinson thought it ironic that the Confederacy liked to work the races together, humanoid with humanoid, arachnoid with arachnoid, in order to facilitate understanding. And here the likeness facilitated murder.

And the hot face of the sun came nearer. Zetha's brazen mother called her home. Never enough Gutu died. They were tenacious and fierce and deadly in their turn. Robinson wondered if the Gutu knew that the only thing he and they were killing was each other's time.

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CHIEF Petty Officer Delphinius sat on a stump by the gate. He was filled with an inexplicable uneasiness, but thirty-four years as a fleet man had taught him to trust his intuitions. He waited now for the reassurance of seeing his friend and commander. At least he could tell Robinson. Robinson would take heed, be watchful. Robinson had the instinct for trouble, too.

Delphinius had been in trouble all his life. He liked to tell men that and grin. His grin lacked a lot of teeth, and his face was pitted and lacerated, a free-form pattern of scars. Sweat trickled from under his dust-colored curls over the smooth skin of his scalp and dripped into his eyebrows. He dabbed at his face with thick fingers, flicked away sweat.

Next to Robinson, Delphinius had been on Zetha longer than any man—fourteen years. He had shared the anguish of the long campaign with Robinson. Both men had become dry and dessicated in mind and body. Both were unwelcome among their rightful peers. Both were being punished. They had swilled together in hot brandy through hot nights, degrading their natures with the hot and stupid bodies of hairless Zethan apes.

Delphinius stared between his chunky thighs and tried to remember a cooler place. He had been so long a fleet man that he had lost the dialect of his native agricultural colony. At home they spoke a blend of Simplingual and frenched Anglic-Terran with moans and gutturals and spatulated vowels. And the vixen Zethan sun had lately burned into his brain vivid memories of Messedorn, the family groves, his father's manicured fields, the stream at Eddys Market and the girls with whole armfuls of pink and orange flowers. He snorted and watched his sweat drip between his legs. He had been a bullish boy, not very bright after all, and too heavy-handed and eager to fight. Exasperated, his father had finally thrown a tote bag at him and said, "Y'll git yer butt up and jine wit' fleet roit noo, bucky bee. Git off!"

Delphinius was assistant commander of Gamma Company. Gamma was the star company in the 551st. Robinson staffed it with his best veterans and the most likely recruits and used it to spearhead every operation. Gamma was sitting ready to begin the newest of the interminable sweeps. They waited for Robinson who was coming the two hundred kilometers from headquarters at Lake Serenity.

The companies of the 551st were deployed evenly spaced in a ring around the desert. Each company had its command post in a square cleared of elephant trees. The squares were walled and in the center were half-sunken barracks. Delphinius liked the elephant trees. Everyone did. They gave shade. They were huge plants, some over a hundred feet high, and on their umbrella-frame branches enormous leaves grew. The leaves had a thick cellulose and

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mucuous skin on top which let in sun but let off no moisture. The sunlight let in by and the humidity trapped under the canopy fed the secondary growth that once nurtured Zetha's big game. The leaves gave the plant its name. They looked like the ears of Terran pachyderms. A man had to be careful that a dead leaf falling did not catch him and knock him down. It had happened.

THE sentry pulled open the gate and saluted Robinson's vehicle as it trundled into the compound. Delphinius watched the commander dismount and start toward him. He measured the officer's stride, judged his mood. Robinson was intent, a bit gloomy.

All the men watched the commander walk across the dirt. Three troop carriers, dully polished, waited against the far wall. Tenders and drivers who had moved in and out of the vehicles, finishing their preparations, now stood and wiped their hands with rags. The company commander climbed out of his hut and stood rather stiffly at the ready.

The six new Vupeculans squatted down to gamble. Robinson strode over to them and kneeled into their circle. One of them shuffled handfuls of multicolored disks in his fingers and then, when the others burbled anxiously, scattered them before himself. Bald heads bobbed. A frenzied round of clucking started. They stabbed with delicate fingers and plucked up disks, threw them down again. Robinson played. At the end of the round, Robinson held up his disks. The Vupeculans chortled and made oval smiles with sphincter mouths and their nostrils puckered in and out, meaning no. Robinson was a bad player. He threw in his chips and the others flapped their fingers and argued out the tally. Only their sergeant spoke Simplingual. His head nodded up and down and he greeted Robinson, "Haddo, Comamer. Haddo."

Delphinius knew the Vupeculans were cursed to have been sent here. They would all be dead in months. Their race burned up on Zetha. Their blood dried and they always seemed to die at night, weeping and shivering. The last to die would die alone, surrounded by Terrans who did not know his language or his medicine. And he would not even be able to comprehend the compassion in the alien faces that watched his life seep out.

Robinson straightened up. "What are the men doing out, Lieutenant?"

The company commander grimaced. He was new and he remembered his first meeting with Robinson. The commander had promised to kill him if ever again he set the troops outside in the heat for a regulation inspection. "They wanted the air, sir. It's been cool. Under a hundred and twenty all day."

"Well, it's hot topside. A hundred sixty-three at the tenth. Get'em mounted up and cooled down."

"Aye aye, sir." The lieutenant

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looked at the chief. "Give the order, Mr. Delphinius."

Delphinius opened his mouth and took a breath. Rapid-fire orders rumbled out of the chamber of his chest. Petty officers echoed the command. The men of Gamma Company climbed to their feet, lumbered out of the barracks, each lugging his gear. They lined up, threw packs and rifles into the carriers and clambered aboard. The lieutenant saluted Robinson and pivoted on his heel.

Delphinius started at once. "It's got me all tied up, the last day or two, sir. I'm a-fret thinkin' sumpin's up, but I dunno. I dunno."

Robinson frowned. He watched the little Vupeculans scamper into the last carrier. The motors hummed and the doors were sealed shut. "We're just going to sweep sector nine. Tremors have been minimal all over the topside for the last two weeks. But there have been Gutu sighted all through the tree line in the sector."

"Aye, well. There's been no shakes till now. No doubt we'll doodle into the wrath of hell."

Zetha, falling on its face, was subject to grand earthquakes, to random breaking of the crust, volcanic gushers, sudden fissures that unzipped in the blink of an eye and frenetic sprays of steam and gas. A man, a vehicle, a whole army could be swallowed by an abrupt, capricious hunger of the planet for flesh and steel. The disruptive quakes were a peril greater than the Gutu, although wandering warriors often hacked the flesh off those stalled by eruptions. And fierce electrical storms in the brittle air had made surveillance flights and gunships an impossibility from the start. They also—frequently—distorted and destroyed radio communication and had made power rays and blasters useless, even dangerous. The 551st relied on old-fashioned big-bore bullets to knock down berserk Gutu charges.

"I wouldn't worry, Delphie. Five days out and back."

DELPHINIUS snorted. Then he abruptly recalled something, and plunged a hand inside his field suit, withdrew a lavender postal tube and handed it to Robinson. "Came with cargo yesterday, sir."

Robinson snatched it anxiously and popped it open. He had waited months for this reply. It took his breath and raced his heart to roll open the scroll. The paper was heavy, translucent—expensive stationery. He blinked at it and pressed his lips together. It had been calligraphed by some scribe in Sirenian script, unfamiliar lettering to a man who seldom had intercourse with patricians. And it was composed in the artful dialect of the Capital, a blend of languages affected by people of affairs. Robinson's letter had been written in terse Simplingual, the only form of composition he had ever learned. He unraveled the phrases patiently.

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To Commander S. V. Robinson, FGC, Subaltern Director-General of the Provisional Protective Military Directory of Zetha, Commander of Forces;

From C. Frank Markos, President, Markos Presentations, Inc., et alia, etcetera.

To my friend Robinson, greetings!

I was most flattered and pleased to receive your private post. Flattered that you should look to me for help in a time of serious difficulty—pleased that the differences of years past do not restrict our continuing relationship.

You have served as a brilliant and inspirational example to me. Your heroic exploits at the now famous Battle of the Mouth of Brythis not only enriched me with material for my news correspondence and commercial dramatic presentations, but also provided me an example of stirring courage and manly leadership.

I did not neglect to notice your mention of a personal debt and this I concede to owing you after using, without your permission, your name and identity as the basis for a fictional hero. However, at the time I assumed you would not be displeased. I am enclosing a draft against my treasury deposit at Napor Silento in the Antigones, closest to you, for twenty thousand visigulls. You can cash it there at your leisure or the Negotiator at the Napor Silento Currency Services Agency, a Mister Eu, will arrange transfer to your account anywhere for a simple two per cent fee. I would trust no other.

As regards the wide-spread corruption and exploitation, which you claim goes on vis-a-vis the miners and government services on Zetha, I can only caution you to guard the rhetoric of your accusations. It is true I have made much of my name and wealth as a respected news agent and analyst, but my career has been guided by prudent consideration for avoidance of seriously complicated controversy and my long experience in and with the ruling circles of our universe prompt me to advise you to wait solemnly for retirement and . . .

ROBINSON grunted, snarled and ripped up the letter. The two men watched curiously the pieces float to the ground and lie dormant.

"He means to buy me off!"

"Sir?"

"This," said Robinson and thrust his finger into the tube. He withdrew a yellow personal draft, tossed aside the tube and began to tear the draft in two. He paused.

So much for his crusade for justice. So much really for his fight to

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save himself and his men from tedious death in hell. Markos had been the last and worst chance. Robinson stared back through his memory at the pallid, clammy little man who had wet his pants in the pitch of battle–which had been more slaughter than battle–and then had run off to produce videos about Bloody Jack Robinson and the 551st, starring Shane Shang.

"Mr. Delphinius."

"Yes, sir."

"Take this draft. After we return from this mission, arrange to have this amount put into my treasury account. You can do business with a negotiator, a Mr. Eu of Napor Silento. He comes well regarded. While we're out I want you to figure–get Busic to help you with the figures–I want you to figure a fair system of distribution of this money as a prize to the five-fifty-first."

"Yes, sir!"

Robinson left Delphinius staring at the draft, dumfounded. It had cost him his pride to go begging to Markos. *And this is a good example of why,* he thought, *a man should never bargain with his pride. But the hand that slaps your face may at the same time hold a reward.* To announce a prize was an honor and a privilege for an officer, a pleasure almost always reserved to a ship's captain when his crew grappled a floater or disabled an enemy vessel. Robinson was pleased to act like the space-going captain he had dreamed of becoming and would never be.

The last prize had been announced to the 551st when they had seized the treasure cache of the Kilton Pirates at Baidn and fleet retained a percentage to reward the forces. If they were to seize anything of value on Zetha the mining companies would demand it as compensation for their losses and the directory would fairly well give it to them and swap favor for favor later.

Robinson jumped into the cockpit of his tractor, slammed down the bubble and poured himself a glass of Vuito, the lusty orange liquor of the Nuns of Kjimk, pudgy little reptilian females who had found that their divine nectar was worth a fortune in exports. He sipped the Vuito and controlled his breathing, relaxing himself.

It had cost Robinson the flower of his lifetime to sweat in the Zethan dungheap. He would take his pitiable rewards where he might. He had not been offworld in eleven years. He was held on emergency orders and he was kept from early retirement by an order of exigency–and they would no doubt try to assassinate him when he did retire. They had reason to fear him.

Robinson shifted the gears in the tractor and rolled out through the company gate. His rabble clattered along behind.

III

INSIDE the troop carrier the men sat six to a bench on both sides.

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But in the third squad the Vupeculans all huddled together by the rear port as was their custom. With each violent shake of the ground they burbled anxiously and squeezed more closely together. It suited the rest of the men who had more room, even enough to lie down.

Delphinius had predicted rightly. In two hours, three big quakes had bumped the troop carriers to a standstill. The last had ripped a wide chasm across their path, necessitating a wide detour. Delphinius' voice boomed on the intercom: "Here we go, lads, a big one starboard."

The men peered through the ports. Fifty yards from the vehicle the ground swelled and cracked like a fast-baking loaf. The floor of the carrier shivered. Then red vapor shot from the cracks and suddenly a chunk of ground was blown away and a geyser of steam soared far overhead. Everyone went back to his seat. Sometimes the steam pockets took days to blow out.

Finch, a brawny brigrat from Terra Nova, lay on his back, his knees up. He was a scrapper and a chronic fence jumper and the Terran Fleet had finally given up and sent him to Zetha. Finch blinked, tightened his face and quickly broke wind like a small clap of thunder.

"Finch, you're a disgust." Brope was sitting at Finch's feet, his arms crossed and his feet stretched out. He was an ox of a man born on Garday. His father was Terran, his mother Shesemii. Frequently the children of such a mating were mules. On that account, Brope suffered a little less than most of the men because he had no sexual appetite.

"Me the disgoost?" said Finch. "Why, 'tis yoo, Brope, joost to look at the loomp of fat on yer shoulders." The rest of the men laughed, except the Vupeculans, who kept their own counsel. Brope was the squad leader, but it was all right to have fun with him. He was simple and good-natured. His error had been that he killed a man, inadvertently, in a bone-crushing embrace in an attempt to keep the man from deserting. Brope was innocent but dangerous. Fleet sent him to Zetha. Very few realized he had been there for ten years.

Brope also happened to speak a little Vupeculan. He had gotten around in his time. His squad was always given the little men. He tried to explain to the others that the Vupeculans got there like anybody else. In the Vupeculan culture there were seventeen cardinal Disgraces. The six men with Brope had committed one, which was to enter a village looking for *imimiv* on one of the liege lord's sanguinary days. The six Vupeculans had confessed after reciting the grueling prayers of contrition during a vigil beneath the black obelisk of Oimoidin. In a less enlightened day they would have been punished by having two of the three sperm ducts pared out of the crotch. Now they were assigned to Zetha.

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"Now, Brope," said Finch, "they tell me here that yoo be knowin' all there is aboot our fine purposes here on Zetha." Finch was a new man. He had been cautioned to set up the right relationship with Brope, which meant to keep a little distance. Brope had religious ideas. But Brope always knew what there was to know about Robinson, Zetha and the 551st.

"There are no fine purposes on Zetha," said Brope.

"Meanin' what?" Finch propped his head on his helmet and stared at Brope from between his knees.

"Meaning that."

"Well, what is it we be up to then?"

"We ride around like so. We go to all the various caves we know they've lived in before and search. Maybe we find an old man or some women, maybe even a buck or two. We kill them and when the time comes we go back and sit."

"Well, noo, tell me what this war be aboot."

"There is no war."

"Well, then, who the hell be I?"

"You're Finch and you're a disgust."

THE men laughed and Brope thumped his head on his helmet. "Brope, yoo're an idiot," he said. "Finch, here's how it is. You're in garrison. You're police. You protect the good Gutu from the bad Gutu."

Finch thought a while. "Ah-hah! But there be no good Gutu."

"There you are." Brope stared a while at nothing. "When it all began was when they found this place, see? The miners worked this planet with no licenses. But then the Confederacy come along and told the miners they'd have to negotiate with the natives, the rightful landlords here, which is the way the Confederacy looks at things. But the Gutu are a mean lot and pretty stupid anyway—and they don't negotiate, see. So the miners come up with a plan to have the little ape people be the natives and they set it up that way, with a tribal synod and a request for a directory. Then the miners just bribed off all the directors who came, and they got the troopers to come here and start killing the Gutu because, as they put it, the Gutu were killing the good Confederated people"

"Ah!" said Finch.

"That was when Robinson and this outfit come here."

One of the men laughed. "Tell him 'bout the rape."

Finch's eyes brightened. "A rape, now."

"It was but it wasn't. You see, there was this lieutenant-commander had a little gal ape that he screwed with. Well, a trooper come by one day and sees her, throws her down and screws with her as well. The lieutenant-commander caught him and court martialed him for rape of a native and all. Well, away off somewhere, some bureaucrat starts feeding all this into his computer for storage and the computer spits it

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back out and says it can't be rape to rape an animal. That's when the works got twisted up and the bureaucrats figured it out that the apes can't be the natives. So they made the Gutu the natives again." Brope pulled on his nose and sat placidly staring at the opposite bulkhead.

Finch sat up. "So?" He jabbed Brope with his foot. "Well, what's the rest of it, then?"

"There isn't any rest of it."

"Well, what's Robinson and all them doin' aboot it?"

Brope nodded. "There are two kinds of people here. Those who take their money and have a good time messing up the place and those who keep their mouths shut and do the humping. Robinson can't do anything. Last time he went on leave, he went off to the Ministry of Peoples on The Siren and requested an audience and come damn close to getting in. Then they arrested him and shipped him back. It's all he can do to keep us off the field as much as he can—and he keeps away from Lake Serenity where he's not wanted and where he's apt to wind up cold dead on his ass if he doesn't watch out."

"Ah, Brope!"

"Ah nothing. This is money you're talking about and plenty of it."

Delphinius' voice broke over the intercom again. "Here it is, lads." The carrier stopped and the men went to the ports.

IT WAS the Mouth of Brythis. Brope had seen it. He went back to his seat.

Brythis was the devil-god of the Utixu who swallowed up in his horrible maw wayward children who stole or pestered cripples or played with their genitals. Brythis seized adults, too, but those he chewed.

The Mouth was an immense bowl, more awesome than anything else in Zetha's elaborate, torn landscape. In the mindless past, rifts had formed in the mantle below and moisture had been forced up through the crust. Rushing into the rifts and hollows had come magma and molten minerals, a natural alloy containing all the elements of the planet. Then, in an instant, the bottom collapsed and the ring around it erupted and splashed molten elements high into the air in waves, boils, columns, spirals, and it all froze there. It remained forever, polished, reflecting every shade and color, some of it too bright to look at.

From the Mouth the Gutu mined splinters with which they made their weapons. And to the Mouth they had led the 551st in the first year of battle. The warriors united. Every man had come, bringing all his trophies and weapons and his boys to carry his extra spears. The 551st had found them dancing and shrieking, singing a frantic ululation—the Gutu exultation over war. And to get to them the 551st had been forced to descend the few treacherous trails in column, with the nation of giants wild and surging at their flanks.

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The Mouth had filled up with slaughter, bodies dumped on bodies, and the living stood on the stacks of dead in frantic defiance. After seventeen years all the bones had finally been carried away.

IV

ROBINSON steered the tractor over a ridge and began a violent joggle to the valley floor. Fourteen troop carriers, a single tank and two scout cars were pulled into a circle below. Mount Misery sat to the north. It hulked above the terrain like a hunchback. Sharp ridgelines radiated from the base of the mountain. The night camp lay in a sandy valley like glistening toys between the mountain's spread legs. A peaked shadow skimmed across the valley floor. As the sun sank the mountain sent its groundcast sniffing for blood.

Robinson's vehicle rolled into the circle and parked. The mountain provided an extra half-hour of semi-darkness, shade, the illusion of a break in the heat. The men spilled out of their vehicles. A mess crew erected a camp kitchen. A water barrel was rolled into the arena and Robinson went to it, marked the night's ration on the glass measuring tube. The men were free to take what they wanted. Experience and the careful eyes of their fellows told them what was fair.

The chief messman handed Finch a plate. "Better eat it before it gets too hot." The messman guffawed. It was an old joke. Finch took the plate and watched Robinson stride around the perimeter, inspecting each vehicle inside and out.

According to military custom, Robinson was the last served. Other officers ignored tradition, but Robinson did not. The 551st maintained a schedule of strict discipline and Robinson considered it his discipline to keep up the morale of the men and to set an example. Robinson took his plate to a small circle where other officers were eating. He sat with them but just a little apart and chewed quietly, efficiently, at his meal. When finished he dunked his own plate in the sterilizer vat and replaced it in the stacks. Then he moved out of sight.

Delphinius stumbled in the gray of night. One trooper played lonesome songs on a mouth harp. The camp had grown quiet. He found the commander lying on his bedroll between two vehicles. Robinson held a slender inhaler, a gold tube containing a euphoric.

"Sit down, Delphie. Have a sniff."

Delphinius accepted the inhaler. "Thanks, sir." He drew the drugged vapor into one nostril. They were silent a long while.

"You were right about the shakes today, Mr. Delphinius."

"Damned if I weren't." The warmth of the drug reached the chief's brain and he sighed. The tense knots in his muscles slackened one by one. "Sir, when does a man know he's up to the end of his hitch?"

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"Delphie, you and me could've gotten ourselves killed many times over the year. Seventeen and fourteen. That's thirty-one years of nothing to live for. But we never did manage to die. A lot of men have. Maybe now seems like the time if you've quit having a reason to stay alive."

"Nope." Delphinius wagged his head slowly. "I ain't put up that way. It's just the feelin' I've got. I keep on dreamin' right along." The chief embraced his own meaty arms. "Things are just breakin' up and I feel somehow the hitch is over–but I can't really say." He shrugged and stood up.

Robinson lowered himself to his bedroll. "Maybe so. My dreams have been getting pretty thin. It's the end of the line when you've got no hope and I can't find any."

He shut his eyes and Delphinius moved away.

OH, MAMA! Robinson gathered an image of his mother, a fat woman, Jamaican. She had bunched the youngest ones around her and left London for better parts. His old man had been drunk as ever, always dying and never managing to be dead. She had thought the oldest had already gone bad and had left him with his father so that neither would spoil the ones remaining. *I wish you'd taken me*, he thought. *Life would have come out some way other than this.*

Robinson had gone to school sometimes, just to learn the mathematics. The cargo sailors at the docks–he had even talked to gold-braided officers, astrogators and pilots–had told them, "Boy, you want to go up there, you got to know the mathematics." He did well when he studied. When his father disappeared, he kept their room by himself, and he kept up his thieving to pay for it. He whipped the lights out of a Kuzian, a Gif, some Terra Novans, any fool who walked away from the docks into Robinson's dreary slum and looked like he might have money. In time he was even brilliant in his studies and one day Mr. Crutt suggested that if Robinson could learn to keep up attendance he would help the boy secure a grant to go to the university. He agreed. He had just one ambition. To fly in space.

One of those periodic attacks of social conscience that grip aristocrats put him where no boy from his background dared dream of going. One day word simply came that there was a billet for a disadvantaged bright young man at the Galactic University in the Academy of Fleet Science–and the billet was his!

He excelled. He was proud of his cadet whites, thirsted for the regular uniform, dreamed of standing on the bridge as an ensign, rising to become ship's captain, the master. In his class of eight hundred, he always rated in the top five. Where he was weak he struggled until he did well.

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In the women's cadet corps had been an unusual girl. She was the daughter of the great Nance Gershon, the industrialist. She was radiant, delectable, a joyful person. And she had ambition. Girls of her class did not follow careers. They were expected to inherit, to become hostesses to the centers of power and to be brood mares to the dynasty. But Stella wanted, before she surrendered to that, to have a few years on the bridge herself. She met Robinson at the Mid-Year Ensemble in which the supplicant cadets were presented. Her betrothed, Cadet Throble, had been ill and she danced with Robinson that night. They fell injudiciously into love.

Stella's family cowed before her will, inherited from her father. But they had been alarmed by the proposal that she not only marry beneath her class but that she break an appropriate engagement to do it. Nevertheless, it was to be so.

Except that Robinson had been so engrossed in his career that he had never noticed that between the other cadets—scions of patrician homes—wound a thick web of alliances. To them Robinson and the few like him were tolerable outsiders. When he courted one of their women he made enemies that stretched from the Academy deep into the fleet. Soon no cadet would share quarters with him. His membership in the Sailors' Club was revoked. His test papers were lost or misgraded. His equipment was vandalized.

Finally, frustrated, he confronted Thorble and Thorble called him out. It was permissible for cadets and for officers without assignments to fight duels. Every Terran cadet turned out on the parade field, row on row of white tunics, silent, certain of who the winner would be. And wondering what revenge would be meted out to him. Thorble fell with a gash in his thigh and his nose shattered by Robinson's handguard. It took only a few seconds.

The next day Robinson was awarded a commission and an immediate transfer to ground forces, with orders to report to the 551st Field Expeditionary Force, then in training.

THE drug numbed him, and Robinson fell into a troubled sleep, bothered by heat, too weary to rest. He dreamed and the laughing girl stroked his cheek and her voice was rich and lustrous: *Darling, you're so handsome in whites!* Next he stood erect behind the helmsman, trembling, for the helmsman steered hopelessly for the points of light, but one by one each went out and he cried, *Sir! Are we lost?* and he tried again and the light diminished into nothing: *Sir! Are we going to die?* But the last light guttered down and then flickered back to life and Robinson answered himself, *No, we are just becalmed.*

Robinson jumped to his feet without knowing why. He heard gunfire, a carbine. He turned and looked out

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beyond the circle of vehicles. The Gutu were massed and running in, hundreds of them. He pulled out his pistol and fired twice into the heart of the nearest one. Two replaced the fallen Gutu. They were quiet! Robinson fired at both, tore their flesh, but they rushed into him, smashed his chest, and he felt himself hurled into deepest night . . .

He awakened startled and turned his head. A shock went off in his neck and scorched a path up and down his spine. He held his head still and blinked. He was in a room of pink walls, constructed of form-a-foam. The walls were warped, irregular. He heard someone murmur and slowly turned his head. A young Gutu leaned on the far wall, his sword in the floor, hands cupped over the pommel. Two females in white cloth skirts sat on the floor by the warrior's feet. It was cool in the room.

One female stood and peered at him, creeping closer. *"Subu h'n!"* she said and the other female jumped to her feet and passed through a drape that hung over the door. The warrior gazed dull-eyed, not able to comprehend the activity around him. He stared into space.

The females watered and fed Robinson and helped him to sit up. They were tall women, but they were young Gutu with firm breasts and soft plaits of hair. Robinson wondered what it would be like to have one. No man had that he knew of. You could not rape a Gutu and the Directory seriously forbade any fraternizing, not that it had ever been possible.

Robinson's shoulder was broken. It had been set and wrapped. He thought he had a concussion. Dizziness crowded him if he stood too long. The females steadied him and wiped his face with cool rags. He was treated to this tender therapy for hours. No one spoke. The girls passed in and out and the guard kept his vigil solemnly.

At last one of the females entered and said, "Joo–come–mmm–me." Both females helped him walk. He felt like a child between them. They helped him through the drapes and he suppressed a gasp.

The remnants of the 551st were scattered before him. Over a hundred men, many wounded and injured–these had been bandaged and splinted. Gutu females moved among the men, serving food and drink, tending to the hurt. Silent warriors lined the walls. He saw Delphinius, arm broken, cheeks slashed. The chief smiled and raised a hand in salute. Four Vupeculans huddled at the chief's feet. Brope was stretched out beside them asleep on a pallet.

They were all in a deep cave, a chill dank place, lighted by stolen lamps. Water dripped from the walls and coursed through grooves in the stone floor. Form-a-foam cells had been constructed along the cavern walls. Robinson always wondered how the Gutu used half the things they stole.

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The females guided him to a side grotto, away from the main cavern and to the door of a form-a-foam cell. One girl pointed for him to go in. Dizziness washed over him. He lurched and went through the door.

HE WAS in a room with a huge desk. The desk had been intended for Commodore Tsu, but the Gutu had stolen it seven years earlier in a raid on the cargo platform south of Lake Serenity. It was of genuine Sirenian shieldwood and cost a fortune. On shelves behind the desk were bound volumes, tapes and a tape reader. Gutu spears and swords were placed along the walls. On one wall was an original portrait of a Synch maiden in mating frock. On the others were star charts, a photo of The Siren and beside it a photo of Zetha, the view from the north pole.

The Gutu behind the desk was named Dak. Thirteen years earlier six reasonably bright Gutu had been selected to go offworld to school. That had been a cool period, during which the miners and the Directory stifled their ambitions. The Confederacy had sent cultural enrichment agents to Zetha for a short while. Dak, one of the six, had gone off to school at Beta Amanda. No one had since figured out what became of the educated Gutu.

Dak was pointing to a chair before his desk. "Please sit, Commander."

Robinson slid into the chair and put his head down for a moment. Nausea tugged at him. Dizziness and fear threatened to make him sick. Finally he raised his head. Dak was studying him, leaning forward on the desk. He wore a green robe and several necklaces. Robinson became aware that he was wearing only his undergarments.

The Gutu had a superstitious regard for the few among them who were actually intelligent. These performed the magic of reasoning with alacrity and were frequently obeyed out of awe.

"How are you, Dak?" Robinson asked. He straightened himself, struggled to compose his emotions.

"I am very well, Commander. It is pleasing to see you are alive. It was not known at any time that you would survive, of course." Dak poured brandy into two exquisite pink crystal goblets. Robinson had lost them in a raid on the officers' warehouse. He could no longer remember when.

"Fattening the kill, Dak?" Robinson took the glass of brandy.

"Only as a manner of speech, Commander."

"I'd like to know what is going on. My men—"

"You have seen your men? Then you know they are in good care. Those who survived. There were casualties."

"What about all our equipment?"

"That unfortunately will mostly have to be destroyed. What is useful will be kept. It will take some time." Dak raised his glass. "I would like to

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toast, as your people do, a noble enemy."

ROBINSON acknowledged and sipped his brandy. He drained the glass. The brandy heated his throat and he sucked in air to refresh his mouth. "How long have you been around, Dak?"

"For many years now. I returned at night with cargo and slipped away. It was impolite of me, but the sailors had been good enough to let me know that any Gutu was shot at first sight. I thought to avoid the social amenities.

"I think you will appreciate, Commander, that this has been carefully planned. We plotted your habits. You have simple habits for fighting simple people. We know your favorite campsites. We know you have become uncareful with your guards. And we had to guide our men to make them fight a different way. It is harder to teach them new habits than it is for your men to learn them."

"I'm impressed," said Robinson. "Listen, Dak, let's get to the point. The Gutu have never tortured people. Why didn't you just overrun us? You've always been straightforward killers in the past."

"Yes, straightforward." Dak's bulk was slightly ludicrous behind the desk. When he straightened he loomed up behind it, reducing its scale and importance. He sensed this and leaned forward again. "You have not been tortured, I think."

"No."

"You will not be—and I will explain. But first I ask you to tell me one thing, to answer a question. Why have you stayed to fight us so long, Commander? Do you hate us so much? You have become part of our very lives."

Robinson thought, looking into his goblet. "I had to get my crystalware back," he murmured.

Dak turned an ear toward him. "What is that?"

"Nothing." He looked into Dak's eyes. "No, I don't hate you people, Dak. I've been here because I had no choice. I had to do it to survive."

DAK nodded vigorously, satisfied. "Good. Then we understand. None of us had any choice. It is necessary to survive, yes? And you will see that when I went off to school it was to find a way for my people to survive."

"Why the hell did you come home then? This place is going to blow up any minute. Your people can't see that, but you can. And there's been this—"

"This killing, Commander? You?"

"Yes, me and killing."

"You would have killed me if you had found me. I knew this. But I knew as well that you could be our survival. I have had to learn to think in many new ways. In unusual ways. Here." Dak reached behind him and picked up a volume. It was stamped LIBRARY COPY. He handed it to Robinson. "It is volume eight of *The Comparative History and Study of*

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Structures and Genetic Affinities of the Anthropomorphic Species of Peoples, by Professor Marg Thqir. Are you familiar with Thqir?"

"No. He's a biologist of some kind?"

"Thqir, yes. I'm surprised you do not know of him. He pioneered in the study of the humanoid life forms. Let me explain. He observed that certain forms are repeated in the universe. Thqir was a humanoid himself, a Vupeculan, in fact. He traveled to over a hundred worlds. He had many students who assisted his study. He wondered if there were common genetic pools or if adaptation to form were predictable under given circumstances—"

"That's all academic to me, Dak."

"Of course. I was in the library at the university, feeling very sad because I could think of nothing to help my people. They are hard people to deal with. They are not only conservative, they are too stupid to be anything else. They are a difficult people to save.

"So I found that book and started to thumb through it to see if my people were mentioned. I looked them up under the genetic tables—the genotype and also the affinity genotypes. Do you see it? Good. The list at the bottom of the column indicates the species with which the Gutu ought successfully be able to breed."

Robinson peered at the page. He recognized the symbols for what in Anglic-Terran is called *Homo Sapiens Sapiens.* Robinson chuckled and handed the book back to Dak.

"So what?'

"Indeed, Commander. Do you not see why you are alive?"

"You want me and my men to breed with your people?"

"Exactly. That is it."

"Dak, Dak, be a realist." Robinson shook his head. A tired grin gripped his mouth. "Your people breed and what does it get you? More babies to feed to the guns? Oh, I realize what you're after. More intelligent offspring. So they'll be a little harder to kill—is that it? Dak, this world is going to blow up. They're going to sit out there and kill you until it happens. They're fools. They love that metal and that money. They'll ride this world to death to get it. The road has run out, man, for you and your people and for me and my men."

DAK listened calmly. He spread his hands on the desk. "Commander, more intelligent offspring they will be, no doubt. But also they will have hearty constitutions. Look at the Gutu physically. Look at the adaptations we are capable of. We are a powerful people."

"But, Dak, you *cannot* beat them out there—no matter how strong you are. And what's the point? There's nothing to save. The world's going to fly—"

"You keep saying that, Commander. But perhaps not for a thousand years. Yes, yes, but perhaps to-

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morrow. I know this. But there are other worlds, better worlds than Zetha by far."

"How do you get to them?"

"Commander, think for one moment. You are tired. You have lost belief! There are not many Gutu left. It is a good thing because without our animals we would only have starved these many years anyway. But suppose that we had a population of brighter children. Now with that and the rights to what they want here so badly, the minerals, the ores—and they are ours by right—" Dak slapped the desk— "we would have something. Your people make billions from us, do they not? If we could have the revenues from that for just one year—but we've not a visigull, not a fobber!"

Robinson pursed his lips. "Even without wealth, perhaps—"

"Perhaps what?"

"Mercenaries. Your people are hell to fight. Discipline them, get a smarter generation together, a little more nip and tuck—"

"Now you begin to think, Commander! That is excellent." Dak looked at him for a moment and then said, "I make this proposition on behalf of my people. Those of you who will agree to this—to father the children and to teach them—will live out your lives in peace.'

"And the alternative?'

"Painless death."

Robinson held out his crystal and Dak refilled it with brandy. "My hitch seems to be over."

"What is that?"

"Nothing. You know, Dak, I've kept myself alive so that I could live my life. Does that make sense?"

"To me, very much."

"Then I agree—if you guarantee that every one of my men will be treated well."

"Some are not useful, not Terran—"

"Those are the ones I mean most of all."

"Ah! Well! It is done, Commander. A toast?" They drank their glasses down and Robinson stood up.

"I will make an announcement to my men in a few hours. I'd like to rest now and I want the guard out of my room."

Dak nodded, smiling, and rushed out of the room. Robinson felt his way into the cavern and looked for his cell. One of the females spied him and came to take his arm. The men watched the sagging body of their commander being taken to his bed and they worried.

The warrior was gone. The room was cool. The girl put water to his lips and helped him to lie down. Her hands, fretful and tender, touched his many wounds, and Robinson stared into the girl's eyes. He realized that Dak must have selected some of the brighter girls to consort with him.

He reached up and ran his fingers over her flat smooth cheeks. "You must be mine, h'm? Well, come on, lie down here. Let's take a little rest." ★

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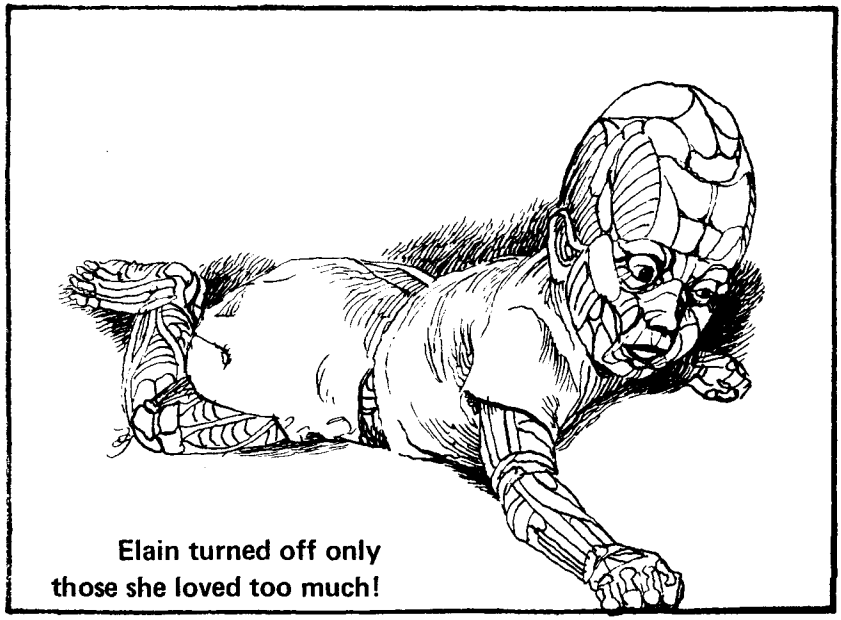

AND BABY MAKES THREE

WILLIAM J. EARLS

THEY bought the baby because Elain said she'd go crazy if she didn't have something.

"This is the best we have," the salesman said. He showed them the super deluxe model. Turned off, it looked like a life-size doll—blond hair, blue eyes and pudgy arms and legs. "It cries, wets, drinks. It's programed to sit up by itself, roll over, put things in its mouth. It can stand up holding onto furniture. It will even teethe and grow two inches in the next six months—and it sleeps twelve or more hours a day."

The salesman put in the power pack and flicked the tiny button behind the right ear. The doll kicked in its crib, lifted its head and looked around.

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"Oh, Jim, he's beautiful," Elain said. She reached over and the baby put out his hand, closed it over her finger and squeezed. She blinked hard, smiled, and the baby smiled back. "May I pick him up?"

"Of course."

She buried her nose in the baby's neck and nuzzled it as the tiny legs kicked excitedly. The baby laughed. She held it close and its fingers touched her face.

"Can we buy him, Jim?" She looked at him, her eyes soft and hungry. She stayed home all day with nothing to do. She'd had goldfish once, then a kitten, then a puppy. The goldfish had died—probably from overfeeding—and the kitten and puppy had grown too fast, become independent animals too quickly, not the soft, cuddly things she had fallen in love with. The robobaby looked as though it might work—it was soft and cuddly, would grow slowly—and the best thing was that it could be thrown away when she became bored with it.

"All of the pleasures of a real baby, none of the pain," the salesman said. "Venerri circuits throughout its body. People who don't know will think you have a real baby." He dropped his voice. "Have you ever seen your wife so happy, sir?"

Elain was holding the baby, walking around the store with it, showing it the reflections in the mirrors, cooing to it, rocking it in her arms, her eyes warm and misty.

"We'll take it," Jim said.

"It needs rest, of course," the salesman said. Jim nodded. The Venerri circuits, which could be programed for anything—including memory, compassion and even daydreams—needed at least one hour of inactivity in three. Everyone had seen an overworked robo—and they were everywhere, doing everything—suddenly collapse when the Venerris burned out. "It's smaller, so that it needs even more rest."

Jim was amazed at the cost. "Because of the programs," the salesman explained. "You can set it to sleep through the night if you want—it never needs a baby sitter. Shut it off when you leave the house. It can even be programed for sickness—if you want to practice before having a real baby."

"We're not planning on it," Jim said.

ON THE way home Elain kept smiling at it, looking down at it in her arms, laughing when it smiled back at her.

"We have to think of a name," she said.

"You think of it. It's your toy."

"It's not a toy, Jim. Look." She whistled between her teeth and the baby waved its arms and laughed. "It's a baby, Jim, and it's ours. Ours."

While she fixed dinner the doll played on the floor of the living room, lifting itself onto the coffee table and chairs, drooling onto the carpet. While they ate she fed it milk

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from the bottle that had come with it.

During the evening, while he worked on papers he had brought home from the office, she played with the baby, then put it to sleep in the extra bedroom. It awoke once during the night. Jim got up—ordinarily he was a very sound sleeper—when Elain didn't, went into the baby's room and shut it off. He heard her in the morning.

"The baby!" she screamed. "The baby!" He ran from the table to her and saw her looking down at the lifeless doll. "It's dead, Jim. It's dead." She was terror-stricken, ashen and shaking.

"No it's not." He reached over, found the small button and flicked it on. The baby kicked, smiled and looked up at him. "It cried in the middle of the night," he said. "You know I need my sleep."

"Don't ever do that again." She lifted the baby, held it close and cooed to it.

When he came home the spare bedroom had been turned into a nursery. There was new paper on the walls, a crib and a bassinette and a dresser full of baby clothes. Elain was sitting on the floor, watching the baby play with new toys.

"You said I could," Elain said when she saw him looking at the paper and calculating its cost.

"I did." He crossed to the picture window and looked down at the harbor. "Are drinks ready?" It was a ritual that they each have two drinks in front of the window when he came home from work. The baby started to cry almost as soon as he sat down. Elain picked him up, but he kept crying.

"What's wrong with that—thing?" Jim said.

"I don't know. He may be teething. There—there—" she said softly. She stood up and went into the nursery. Jim waited for her and, when she didn't come back, followed her. She was sitting in a chair holding the baby, trying to feed it. There was a dirty diaper on the floor and Jim wrinkled his nose in disgust.

"They do that, too?" he said. She glared at him, indicating that the baby was going to sleep, and asked him to leave the room.

HE WENT back to the picture window and slumped into a chair waiting for her. When she came out the drinks had turned to juniper-smelling water in the pitcher.

"I didn't think it would take that long," she said. "He's teething, I think."

"Teething—"

"Babies are like that. They teethe, they make messes—but they're so lovable. Oh, Jim—"

"It's a doll—a robot," he said, harder than he had to.

"No—don't say that. Think of it as a person." She bit her lower lip, blinked hard. "I want a baby—someone to love—so much. It's a baby. It has to be." She looked away from him.

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"It's not."

"Please, Jim. Say it's a baby. You don't know what it's like, being home all day with nothing to do."

"You had the goldfish, the puppy."

"The goldfish." She almost laughed. "They died. I overfed them, remember?" From the nursery came sound—they could hear the baby cry for an instant in its sleep. "I need this, Jim."

He looked at her, so tiny, so alone. "Okay," he said. She reached out her hand, took his and they sat in front of the window for five minutes until the baby cried.

The baby awoke during dinner, too. Elain fed it at the table, holding the bottle with her chin, the baby cradled in her left arm as she ate.

"I really think he's teething," she said. When dinner was over, Jim found the instruction book that had come with the baby and read it while she rocked the child and crooned to it.

"What kind of a program is the baby on ?" he asked when she had tucked it in for the night.

"The one he was on when we—got him," she said. She looked defensive. "Why?"

"I just wonder if he should be awake as much as he is."

"He's teething," she said.

"Isn't he supposed to sleep twelve hours a day?"

"All babies are different," she said. The baby woke once during the night and she left the bed to tend it. He rolled over, angry at being awakened.

Elain was feeding the baby in the new high chair when Jim came into the kitchen. She smiled at him, then fixed his breakfast—though he had told her many times he didn't need it—as the baby played with its cereal. When he called home at noon he could hear the baby in the background as he talked to her. When he came home the baby was in the playpen and Elain was watching it. She fixed drinks and they sat in front of the window while the baby cooed and gurgled behind them.

"Isn't he beautiful?" Elain said. He nodded, knowing it would please her. "Do you think Byron is a good name?"

"Byron?"

"For the baby."

"Fine."

"I mean—do you really like it?"

"Yes." He reached to touch her face and she kissed the palm of his hand. The baby started to cry.

ELAIN sent out birth announcements, called a christening service and arranged for a short ceremony. On a shopping trip with the baby she signed up for a photography gimmick—one picture a week for a year. She joined a Young Mothers Club. She told Jim that she was happier than she had ever been before and he believed her—she smiled more now, laughed more often and seemed like a young girl again.

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She was also more tired than she had been before. Byron woke up once or twice a night and seemed to be awake all day, but that didn't seem to bother her. She had never been an intellectual—in spite of her college education—and holding the baby, taking care of it, sacrificing for it, seemed to fill a need in her that had not been hinted at before. She had always been lonely, she said, but he had never guessed at the depth of her need to be with someone.

It was all Byron now. He would wake in the middle of the night and Elain would go to him, feed him and rock him back to sleep. He crawled on the floor, drooling onto the carpet and destroying magazines. He wet himself often, threw up onto Jim's best shirt one afternoon when he held the child at Elain's insistence. Elain didn't want drinks in the afternoon any more—she forgot to make them several times, rarely finished the one she made for herself—although it was she who had begun the custom, as she had begun most of their rituals that made them different, she said, from all the other people who had ever lived. The baby was there constantly, demanding to be held or changed or fed, having to be lifted away from dirt, breakables and electrical outlets.

"I don't think the baby should be awake all the time," he said.

"It's just healthy, that's all. We wouldn't want a sick baby, would we?"

When he looked again for the instruction book he found the thing more tattered and torn than he had expected it to be. He knew that she had been using it often.

"Have you been changing the program?" he asked, knowing that she had, knowing that she was doing something to keep the baby awake and active.

"Look how healthy he is," she said instead of answering. She lifted Byron and touched his mouth. "He has a tooth already. You can feel it." She made Jim run his finger over the baby's gums. He could feel a tooth under the softness.

"It's a tooth," he said.

"You don't sound very impressed. Don't you care?"

"I care about you."

"You should care about the baby, too." She turned her back on him. He looked at the instruction book in his hand and decided to call the salesman.

"TWELVE hours of rest are mandatory for that machine," the salesman said. "You've seen that it—uh—digests?"

"Too well."

"That's a special formula. When the machine is resting, either turned off completely or just when the child is sleeping, the chemicals actually rebuild and strengthen the circuits."

"In other words, she's really feeding it?"

"It only needs one or two feedings a week. Most of the rest is wasted, but the owners like to think they

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have a real baby. Many feed them four times a day. They feel motherly—and it's good for them."

"It's the lack of rest that bothers me."

"The machine has to be rested." The salesman looked down for a moment. "She likes the doll quite a bit?"

"Yes."

"Some young mothers are overzealous at first. The doll is made for about a week of overuse."

"We've had it three."

"You've never had a baby before?"

"No. We had a puppy once. Goldfish. She overfed them."

"Some women do that. They love too much." The salesman shook his head slowly. "You'll have to make her understand."

Elain wouldn't understand. "It's because he's so healthy that he's awake so often," she said.

"He's only awake because you keep him awake."

"I need him." She picked Byron up and held him close.

"It's not good for him to be awake so much."

"You're just jealous," she said. "I need someone to love, that's all. You have your job and you can't love me the way Byron can. I thought you could, but it's impossible. I need him, Jim."

"Okay," he said. He knew she had never been so content and he listened while she told him what Byron had done—climbed onto the coffee table, drank from a cup, played peek-a-boo. She had taken him shopping and people had told her what a nice baby she had.

"WOULD you like a drink?' she asked. He nodded; it was the first time in five days she had asked. She put the baby onto the floor and put ice cubes into the pitcher, splashed some vermouth on top of them. Byron started to cry.

"I think he needs a change," Elain said. "Will you add the gin, dear?" She ran into the nursery with Byron in her arms. Jim crossed to the window. Down below he could see a freighter being pushed upriver by tugs, a barge loaded with garbage going the other way. He poured gin onto the ice cubes and stirred.

Elain came from the baby's room before he had poured the drinks. She put Byron on the floor near his newest toy. He laughed and clutched at it. She came over to Jim, kissed him and held out her glass. He poured her drink. They clinked glasses and sipped.

"You do understand?" she asked.

"Of course," he said slowly.

"Isn't he beautiful?" Elain looked at the baby. It was standing at the coffee table, holding the top with pudgy hands, reaching for the magazines just out of reach. Elain smiled, said "Hi, baby," and the child turned to her and beat his hands on the table in excitement.

"He is beautiful," Jim said. "Did he rest today?"

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"A little," she said. Which probably meant not at all. Byron had been awake at seven in the morning, had been awake when Jim called home at eleven and Elain had taken him shopping in the afternoon. It was now past five. Ten hours. And it would be awake until about nine. It would then awaken at least once during the night. About eight hours of sleep—and supposedly it needed twelve.

They were both watching Byron when he fell. One moment he was standing, holding onto the table, and then he tipped to one side, thumped onto the floor and lay there not moving.

Elain dropped her glass and ran to the baby, skidding to a stop on her knees beside it. She lifted it and looked into its dull eyes. It was breathing and tried to smile back, but the mouth was crooked and the look was pitiful.

"Jim. It's—sick."

"Easy, dear." He kneeled beside her and looked at the doll in her arms. Funny how much it looked like a doll now. The hair was false and too thick, the color in the cheeks too red. It was stiff, hard—not the way a real baby would feel—as though it had already been made up by a mortician. It kicked convulsively and . . .

"It's dead. It's dead!" Elain screamed. She held the doll in her arms and rocked back and forth with it, moaning, "My baby, my baby."

"Easy, dear. Easy," he said, thinking of the money it had cost, of the furnishings and accessories they had purchased.

"I want my baby," she moaned. "I want my baby."

"It will be all right," he said. "We can do other things, go on vacation—"

"My baby."

"There are other babies. We'll get one."

"I want this one."

He took a deep breath, lifted her tear-stained face in his hand and looked at her. It had never occurred to him until now that she was not pretty.

"It's not a baby," he said. "It is a doll. A toy. It was never alive—and it can never be dead."

"It was my baby." She was angry now. "I loved it."

"I love you."

"Don't you care about the baby?"

"It isn't a baby."

"It is!" She fell against his chest, the limp doll in one arm, sobbing. When she stopped shaking, he put his hands on her shoulders and looked at her. He lifted her hand and put it to his mouth, kissed the tips of her fingers and the palm of her hand.

"I'm sorry," he said. He watched her blink away tears.

"You don't care," she said. "I thought you would, but you don't." The hand she had on his face reached behind him and shut him off. He fell heavily onto his side and she sat on the floor, holding the baby in her arms, weeping softly. ★

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Continued from page 88

passionate observation. It is a little wearying to read this kind of shriek; surely the truth stitches in and out of both their fabrics and will emerge in its good time.

Ursula K. leGuin's *The Lathe of Heaven* (Avon, 95¢) is out in a handsome paperback. If you haven't read it, you're impoverished; enrich yourself. Lester del Rey's welcome collection, *Gods and Golems*, contains my very favorite sf story, *For I am a Jealous People*; rereading it after all these years, I still think so, doubled. Another welcome collection is *A Pride of Monsters* by James H. Schmitz. (Collier, $1.25) which includes *Greenface*—I think, his very first published story—and *The Pork Chop Tree*, and three other good ones. A nice package.

I'm going to steal a little space here to tell you about something Wina and I are into. It's hard to say just when it began—each of us, long before we met, had worried away at the basic thinking, but it was Wina who really made it happen. Without being faddists or back-to-nature freaks we've started to grow various kinds of sprouts right in the kitchen, at about 11¢ a pound (vs. $2.00 in the supermarket) and we've started to raise rabbits, which give us high-quality meat for 14–16¢ a pound, plus pelts which we are accumulating toward a bedspread and jackets. We bake our own bread—lots of it—and use it to barter with: two loaves for a brake job on the VW, for example—half a bushel of prime avocados for three. In a garden no bigger than a large living room we have herbs and spices and medicinal plants and the usual array of salad greens—and last year we had brussels sprouts, broccoli, corn, beets, carrots and Swiss chard to give away. Meanwhile Wina has become an expert on roadside plants, many of which are edible or therapeutic. The more we do the more we learn. For example, you don't even have to have land. A bucket of soil and 45¢ invested in sets will give a family tomatoes all summer long, grown indoors. We are not Cassandras crying catastrophe, but I had a kind of vision one day: Wina and I standing at the window looking down at the next street. About eight doors down, a house was afire. We were waiting for the sound of the sirens—and after a few minutes I turned to her and said: "They're not coming." End vision . . . but if something happens, something that makes our money no good at the store, or if suddenly there's no store, well, we will not, like many people, be at the mercy of the present contents of our stomachs. We'll know what to do, what to find, where to go, whom to take with us.

Think about it. Think hard. ★

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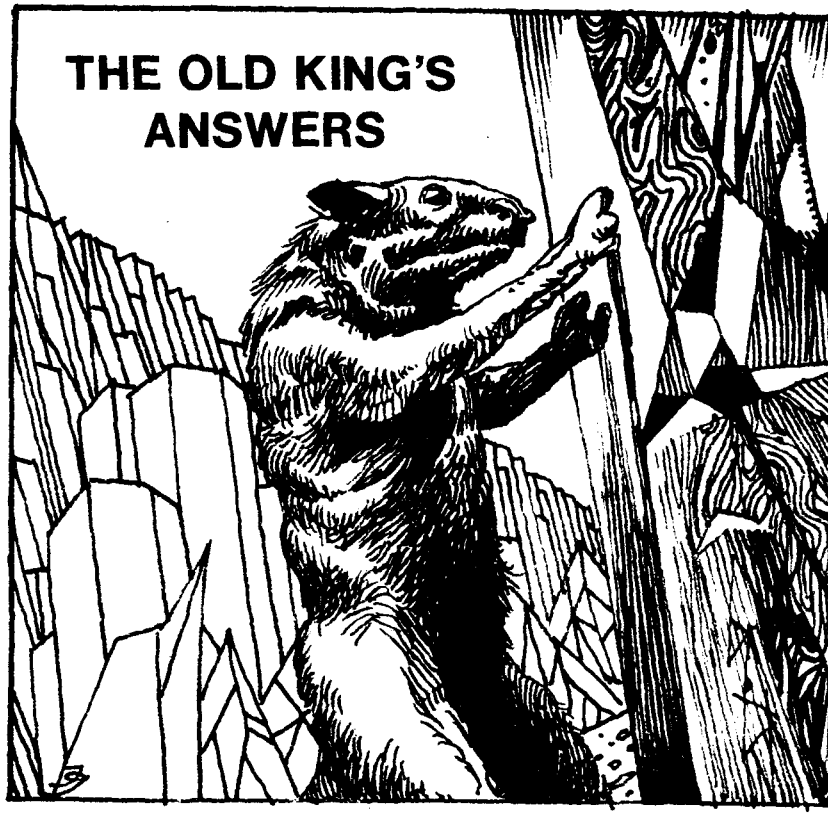
THE OLD KING'S ANSWERS



NOVELETTE

The problem was whether mankind could learn to live with its fathers!

COLIN KAPP

I

"I DIDN'T get any darned facts about this mission," protested Professor Seemly Vivian, tossing her unruly hair back from her forehead. "They canceled my tutorial leave, hustled me out of Lunar University and shipped me out here so fast I didn't have time to locate the paperwork."

"Serves you right, Seemly," Captain Robin Andersen said unfeeling-

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ly. "You shouldn't accept Space Survey assignments if you don't want an exciting and varied life."

"The excitement and variation I can stand. It's the lack of information that's bugging me. Just what am I supposed to be excited about?"

"The old king's answers," said Andersen, turning his attention back to the scoutship's controls. His enigmatic perverseness carried an unexplained edge. Clearly he, too, had feelings about this particular mission.

Chad Hartzman, the third member of the survey team, looked up from the navigation console.

"If you won't tell her, Robin, I suppose I must. It's like this, Seemly. A storm blew up in the Federation Council when Space Survey refused clearance for the colonization of the planet, Loric Four. A quorum of the council contested the decision on the grounds that Space Survey hadn't filed sufficient evidence to show why Loric was unsuited for human habitation. Fortunately the survey commissioner refused to move on the point and managed to force a postponement. Then he collared Robin and myself, told us to acquire you regardless of expense and get the hell out to Loric for some answers he could use on the council rostrum."

"But if he's made a case for refusing clearance, he must already have his answers," said Seemly reasonably. Her dark eyes were questing and alert. Stray wisps of hair had already crept back over her forehead.

Robin Andersen returned to the conversation. "He may have the answers, but he hasn't told us what they are. At a guess, the material is either untenable or not particularly convincing. I'd presume that only the reputation of the official Resident on Loric has prevented the commissioner from being overruled. So our mandate's to make an independent assessment of Loric and report back."

"If we have to reestablish all the base data," said Seemly, "it could be a very long job. Why can't we merely reexamine the work that's already been done?"

"There's nothing against that. But if the Resident's gone off on a tangent we must be careful not to follow him. There's no point in an independent investigation if it's going to start from premises that may or may not be false."

"But I still don't see why it was necessary to drag me back from tutorial leave. Surely this assignment could have been handled by a routine survey team?"

"It isn't a routine assignment. We've been handpicked to solve the commissioner's dilemma. You're one of his big guns, Seemly. He's pitting you against the old king—and he's obviously prepared for a fight. Whoever has to bring down the old king is going to need all the standing of Professor Seemly Vivian."

"I refuse to be used as a sort of academic battering ram," she said severely. "I'll make up my own mind as to whom I depose and for what

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reason. How much to we know about Loric Four?"

Chad slid the abstracts across the table. "There's nothing very special about it. According to the manual, it's a fair candidate for colonization. All the critical parameters are centered around Earth-norm and no major hazard areas are indicated. There's a blanket protection order covering the indigenous fauna, but that still leaves considerable scope for adaptive colonization."

"So where's the problem?"

"Darned if I know. The Resident's had a ship down there for a couple of years and seems to have survived quite happily. Nothing in our records suggests the place is unsuitable for human habitation."

"It can't be as simple as that."

"There are a couple of oddities on the books. Two of the survey ships making field contact with the Resident crashed on their subsequent takeoffs from Loric."

"You mean survey trips like this one? Two ships out of how many total?"

"Just those two," said Chad. "I'd hoped you wouldn't ask."

"And is there anything else about this trip that you're being too damn nice to tell me?"

"Not really—except that the only other woman ever to set foot on Loric ended her life by jumping off a cliff."

"I knew there had to be some good reason why I couldn't get my hands on the paperwork," she said seriously and went off to the galley in search of coffee.

THREE days later the little survey scoutship made orbit around Loric Four. Seemly had spent the intervening period reading and rereading everything that had an even remote connection with the planet. Now she acquired the optical bay and spent several hours with the big telescope while Andersen and Hartzman made the preliminary instrumental analyses. Finally she sought out Captain Andersen.

"Tell me about the Resident down there, Robin."

"None other than the old king himself."

"Why do they call him the old king?"

"I suppose it's basically because his name's Kohl—Peter Kohl—the grand old man of extraterrestrial exploration."

"I've read his books, but I didn't get the impression he was old."

"Not in years, perhaps. But in terms of experience he's seen and achieved more than most of us could in several lifetimes. So whichever way you look at it, I guess the title's apt. He's the old king."

"And we're supposed to make an independent assessment of a space territory he's been working on for two years. It doesn't make sense."

"It does if you assume the old king's answers were the kind nobody wanted to hear. I think that's the point of sending you out here, Seem-

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ly. You've the status to depose him if you disagree. But if you happen to concur, then not a damn soul in the universe is qualified to argue with the pair of you. The commissioner has hedged his bets most carefully."

"Mm! I'll sort out the commissioner later. How does a Resident function in a situation like this? Is he alone down there?"

"No. As Resident, he'd have a small naval garrison. A ship and about twenty men to handle security and routine, so that he's free to carry out any research he chooses. Under Space Law the planet is legally his until the Federation Council replaces him by another Resident or by a structural colony. At the same time he's the custodian of the planet on the Federation's behalf. Presumably he has to answer some hard questions if he lets it slip out from under him."

"I thought you were being serious."

"I was. The point I was leading up to was that he'd be well within his rights to refuse us permission to land. If he tells us to go away again, there's not a thing we can do about it."

"Is it likely?"

"No. But I can imagine his feeling slighted at having his conclusions questioned. So we'll need to treat him with a little tact and a little due respect. Please don't antagonize him, Seemly."

"I don't know what you mean."

"You know exactly what I mean. I've seen you completely dismantle men. But I doubt if you're a match for the old king. Start getting tough with him and you'll probably get your little academic hide tanned where it hurts the most."

LANDING permission having been granted, Andersen put the scoutship accurately down on the landing pad. While the area cooled he and Chad Hartzman carefully donned dress uniform in preparation to meet the Resident. Once the formalities were over, they would relax and become themselves again, but protocol decreed that first contact be conducted with full ceremony. Seemly, trim in her green Space Survey uniform, had not attended a Resident's reception before and was slightly apprehensive.

A smart escort of naval ratings came to conduct them to the Resident's ship. In front of the ship, under a white awning erected especially for the occasion, Seemly had her first glimpse of Old King Kohl. While Andersen presented their credentials and made formal introductions she could only stare at the imposing giant of a man who sat bare to the waist on an upturned crate and rumbled through his beard in a voice like thunder. Protocol, it seemed, made no demands on the appearance or conduct of Residents themselves.

The old king's hide was nutbrown, tanned and ripened by exposure to a dozen alien suns. Beneath his close-cropped hair, which had been prematurely bleached to strands of plati-

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num, blue eyes peered out, constantly inquiring and amused. The leathery face was alive with comprehension and concern. His frame was large, yet with loose and wiry limbs.

He stood up suddenly to emphasize some point and she found her eye level disconcertingly in the middle of the grizzled mat of hair that covered his mighty chest.

Later she returned discreetly to Chad's side.

"He's big," she whispered.

"Big in every way, Seemly. Robin's not at all keen on being sent to reexamine Kohl's work. And as far as I'm concerned he's the king and we're the fiddlers three."

"Is he married?"

"Once was. His wife was Marion Matteau, the exo-biologist. She was with him here on Loric before she died."

"Died?"

"She's the one I mentioned. She apparently threw herself over a cliff. Not a shred of a reason why. Must have been quite a blow to him. She was quite a remarkable woman."

"He's pretty remarkable himself, if you ask me."

Robin Andersen beckoned them back to where he and the Resident were engaged in conversation.

"I've been explaining to Doctor Kohl the purpose of our visit. It appears he hadn't been informed of the Federation Council's opposition. Were there any points you wished to take up at this stage, Seemly?"

Seemly found the old king's eyes watching her shrewdly. She turned to face him, wondering what was passing through his mind and suddenly feeling the need to justify her position.

"I've been trying to understand your reasons for refusing colonization, Doctor Kohl. As far as our reports go, your stand is untenable. The climate and the soil are fully compatible with Earth's agriculture and many of the native plants are edible. Admittedly there are a few large predators about, excluding some creatures described as bears, but nothing a well-defended colony couldn't handle. The air's good and the water's good and the manuals don't give a single hint of anything that might support your refusal."

"My reasons aren't written into the manuals, Professor Vivian. Not yet."

"Then they can't be very manifest. I know the responsibilities of a Resident tend to induce excessive caution. But you must see there's a realistic balance between potential dangers to the colony and Earth's crying need for living space."

"That's only part of a Resident's responsibility," said the old king gently. "Under Space Conventions he's also to consider the effects of colonization on the planet's indigenous population. Specifically, no planet may be colonized if such an act might prove detrimental to any indigenous species considered to be in evolutionary ascent with a possible potential approaching that of man."

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"Which condition doesn't appear to apply to any of the species so far recorded in the Loric indices."

"Well, since you've been given the mandate to make an independent assessment I'll leave you to form your own conclusions–after you've had a chance to investigate. If you want to discuss anything you'll find me available. Copies of my reports to the commissioner are also yours for the asking. But I'd prefer you first to form your own conclusions, then check your findings against mine. That way I can't be accused of subjecting you to bias."

"We couldn't ask for fairer than that," said Andersen hastily, taking Seemly firmly by the arm. "I appreciate the way you're taking this, Doctor Kohl. It can't be easy for a Resident to accept that his work needs to be reexamined."

"I don't accept that it needs to be reexamined. I merely accept that my findings don't sit too easily in the soft guts of the commissioner's office. Your reevaluation can only strengthen my hand."

"Assuming we agree," said Seemly pointedly.

"Oh, you'll agree, my dear. You may make a few false starts, but if you're the type of person your reputation suggests, then I shan't have lost a cause but gained an ally."

II

"I STILL can't put a finger on what's missing," Chad said some ten days later. "The larger predators are dangerous but controllable. The smaller omnivores cover a wide spectrum, but only the things called bears have any dominance–and that may be only a regional phenomenon. The true herbivores are fleet of foot and only as intelligent as you'd expect from their low position in the food chain. There are no reptiles worth talking about–and though insects are plentiful, some sort of hornet appears to be the worst hazard. Haven't you come up with anything, Robin?"

"Afraid not. Radioactivity marginal. Ultraviolet is a little high, but not beyond Terran tropical levels. Cosmic radiation is low. The primary distribution of elements approximates that of Earth, though the allotropic forms suggest a different and more recent thermal history for Loric. As far as my work is concerned–this is a good place to come for a holiday. What about your pitch, Seemly?"

"I've been checking the interreaction between the indigenous resources and the human animal. The garrison doctor's done a very thorough job of recording the progress of every sting, cut or infection suffered by the Resident's staff over the past two years."

"And?"

"Nothing showed up. No poisons or allergies that didn't respond to treatment and no infectious diseases outside the range of human expectation. In short, I'd expect to be safer

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here than in many places on Earth's equator."

"Which," said Chad, "brings us neatly back to the point that we can't even discern the area in which Kohl's objections lie."

"I've been thinking about that," said Seemly. "About the two space crashes—which may or may not be relevant—and particularly about the death of his wife. Apparently she went off one day to a canyon about two kilometers east and walked straight over the edge. An hour earlier she had been in the company of Kohl and other members of the garrison, who all testified that she'd been quite normal and very enthusiastic about the progress of her work."

"Could her death have been an accident—one Kohl has rationalized to place the blame on some local influence?"

"It's possible, though I'd have judged him to be a more balanced character than that. But in the absence of a more definite lead, I'd like to look at the idea more closely."

"Well, I'm in agreement," said Andersen. "As a matter of fact I've already been out to the canyon. It's called the glass canyon and is a fabulous sight. If you feel like going there this afternoon I'll show you the way."

"You won't mind if I tag along?" asked Chad. "I was going in that direction anyway. I want to lay some cameras along the bear tracks. The most intelligent creatures I've found on Loric are the bears. I've a feeling they merit a bit of extra study."

"That's interesting," said Seemly. "Because that's substantially what Marion Kohl *nee* Matteau was saying shortly before she went over the cliff."

BEYOND the fringes of the forest they came to the glass canyon. As Anderson had promised, it was a fascinating place. During some struggle of truly amazing geological forces the land had literally been torn apart and a vast fissure had been formed—a canyon nearly a kilometer across and a quarter of a kilometer deep—a canyon more brilliant and beautiful than anything they could have imagined.

The fissure was a vision of wonderland. The deep bedrock of mainly glasslike silicates had been fractured along cleavage lines and crystal boundaries and age-old prisms of nearly flawless crystal glass stood tens of meters high, like the stockroom of a manufacturer making chandeliers for giants. The powdered frit had fallen to the floor of the canyon, there to receive a carpet of forest loam washed down by the occasional storms—and on it flourished lush vegetation. Through the grasses and shrubs the bears had worn paths of pure enchantment down to the crystal sand.

The real wonder of the place, however, was the crystal bridge. A vast hexagonal prism leaned out from the foot of the forest to span a full half kilometer of the canyon's head.

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To conjecture that it had been placed as a bridge to provide a path across the great gulf in the land was easy—certainly it was widely used as a bridge by the bears and other animals, as many paths leading to its extremities testified.

To cross its glasslike length over the deep brilliance of the canyon was an experience to daunt all but the most experienced climbers. The complete absence of hand- or foot-holds, the unbroken exposure to the occasional gusts of wind and the profound sense of vertigo such an exposed and transparent situation could produce, bred a sensation so alien to human instinct that Seemly, for one, at first refused to do more than lie down on the spar and peer breathlessly into the crystal depths.

For the rest of the afternoon she and Andersen helped Chad set his cameras and instruments along the bear paths and never mentioned the exo-biologist whose death had brought Seemly to this site. She had already decided for herself that wonder alone could bring a person to this spot—and accidents were a continuing possibility in an unknown environment. She forgot about the whole incident until, while leading the party on its return that evening, she came across the old king standing in the path.

HE WAS wearing a loose tropical jacket, partly unbuttoned. From its open front the head of an infant bear poked inquisitively.

"Professor Vivian—what a pleasant surprise!" Kohl seemed genuinely pleased to see her. "How's the investigation going?"

"Not too well at the moment," said Seemly. She waited for Andersen and Hartzman to catch up. "Frankly we can't find a thing to worry about."

"You will. If you want a hint on where to look—the problem has to do with the bears." He reached into his jacket, extracted the small creature and held it gently in his arms. "This one was Marion's pet. Unwittingly it caused her death. Cute little rascal, isn't he?"

"He doesn't look dangerous."

"Butter wouldn't melt in his mouth. But he was an accessory before the fact of her demise as surely as some of his kin caused the loss of two survey scoutships."

"That charge would need quite a bit of substantiation."

"Oh, I can prove it all right. But I rather hoped you'd do it for me."

Seemly stroked the little creature's head with her finger.

"I don't suppose you'd consider letting me have it, would you—as a pet?"

The old king rumbled into his beard: "In the circumstances I couldn't take the risk. Even if you weren't the cleverest, you'd still be the most charming person on Loric. We can't afford to lose you."

"I'm not superstitious, you know."

"Neither am I, Professor Vivian."

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"Call me Seemly."

"Delighted! But as I was about to say, it wasn't superstition that killed Marion. It was a force more logical and compelling than any magic."

"Well, what do you make of it?" she asked the others when Kohl had continued on his way.

"He could be rationalizing along the lines we discussed earlier," said Chad. "After all, what can a small bear do except bite you or transmit some infectious disease?"

"Which we know from the garrison medical records, didn't happen," said Seemly.

"It tends to confirm our suspicions that the bears are important, though." Andersen was thoughtful. "Whether Kohl has a phobia about them or whether they do constitute some form of danger remains to be proven. But Kohl seems convinced, so I vote we concentrate our attention on bears for a while. Pity he wouldn't let you have that one for a starter, Seemly."

"And there's an odd thing about that, Robin. Because I don't know why I asked him for it. I've never been a great one for pets. But just for a moment I really had a feeling for that little one."

"Frustrated maternal instinct," commented Chad. "Next thing you know, she'll be going broody on us, Captain."

SOME time after midnight Seemly awoke in her cabin and turned on the lights. The notes on which she had been working were still on the open flap of the desk. Shaking the sleep from her head, she sat on the corner of the bunk and leafed through the papers, as though seeking in them a key to something not yet written.

Rubbing her forehead to try to stimulate some thought that refused to come, she shrugged off her nightwear, donned her working coveralls and went out to the galley to make coffee. The discussions of the day still lingered in her mind and she knew that, for a while at least, sleep would be impossible for her. She felt certain she was on the verge of a breakthrough of some importance, but the elements of the idea refused to come together.

Exasperating!

Coffee made, she sat abstractedly, not really relishing the bitterness of the particular brand with which the ship had been provided. Then, realizing she was wasting time when she could be doing something with it, she picked up her field kit and went outside.

Loric had no moon, but the light from the bright Rim stars was ample compensation. Against the blackness of a cloudless sky the firmament was aglow with an aerial brilliance indescribably richer than the starlight of Earth. Seemly found she could easily discern the paleness of the track against the darker foliage—and even when she entered the confines of the forest there was still sufficient light

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to supplement her memory of the way.

Soon her eyes adapted to the dimness and she was able to walk faster, possessed now by the certainty that she was on the trail of something really significant. The origin of her feeling was not too clear, but intuition had been her guide through many a trial in the past. It was certainly pulling for her now.

She came to the crystal bridge sooner than she had expected, and marveled at how short the walk had seemed. Her destination lay on the other side of the glass canyon and the bridge shone before her under the bright stars like a shaft of light frozen into crystal immobility. It was curious, she reflected, how much easier it was to walk across the spar without the distraction of being able to see the depths of the canyon below. She recalled her foolishness earlier when, at one point during the afternoon, she had set a foot on the bridge and nearly fainted from vertigo.

The far side of the canyon wall presented a difficult climb up a rockfall. Fortunately the bears had compacted little footholds and runs of steps, which helped somewhat. Finally she gained a firm bear track, which, though sloping upward at a disconcerting angle, proved relatively safe. She broke several fingernails during the ascent, but at last emerged triumphantly over the crest and rested for a while on a damp and grassy bank.

FROM there on the going was easier. A clear track led across the grassy slopes into a continuation of the forest. Seemly sighed with relief as she labored up the final bank and eagerly entered the trees beyond. Here the foliage was denser and the starlight filtering through the branches was barely sufficient to show her where to place her feet. Time and again she blundered into small bushes and only regained the path by a series of fortuitous accidents. By now her enthusiasm was burning at fever pitch and the trials of the journey only made the final prize more desirable and more worth the effort. She could not restrain herself from hurrying.

Then shock! She stepped forward and fell into an unseen depression heavily disguised by the darkness. She avoided hurting herself in the fall—she seemed to have landed in a peaty bowl—but her tribulation made her suddenly aware of herself and the alien situation into which she had stumbled. Her sudden apprehension became a chilling bolt of fear. A rustle of movement around her made her shockingly conscious that she was not alone. Panic rose high in her throat as she strove to come to grips with the instant nightmare into which she had awoken.

Creatures were moving all around her. Whether a few or several dozen, it was impossible to tell, but there were certainly a great number. Not knowing how many only added to her terror. From the hint of starlight

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occasionally reflected in bulbous eyes she became convinced she had fallen into a covert of bears. However, the most complete damage to her equilibrium was a realization that the impulse that had fetched her here was devoid of a rational basis. Like a drunk who wakes on a strange floor, she had only the vaguest recollection of her motives for coming—and felt a dreadful certainty that her situation would have been untenable by daylight logic.

A sick dream had become a frightening reality.

Something brushed her hand in the darkness and she screamed. It came upon her suddenly that the bears were omnivorous—preferentially carnivorous—and that she was unarmed and hopelessly outnumbered. She had occasionally seen carcasses of large animals torn apart by the bears. A gruesome observation remained in her mind—the bears never picked a carcass clean. They tore only the meat they wanted and left the scavenging to ants and eaters of carrion. The observation made her retch with fright.

Her field kit was in a strong case of hide, heavy with the bottles and instruments it contained. She slipped it from her shoulder and, holding it by the strap, struck about her, her panic increasing with every swing. She could tell by the little patches of starlight reflected in their eyes that the bears had closed a circle around her, but they were nimble enough to avoid her flailing box. However, it needed only one to make the first move. As soon as she felt the claws and sharp teeth in her flesh, she would have to concentrate on that. While her attention was thus diverted, the rest of them would spring. Powerful jaws would strip her flesh away from the bone even as she fell . . .

Seemly knew that her only chance was to make the decisive move first. If she could force a passage through to the pathway she might have an opportunity to run. Seeing a slight patch of a lighter color at the edge of the bowl, she moved in that direction, her box still flailing on all sides. Then, thinking only of flight, she ran full-tilt at what she judged to be a break in the circle of bears.

There were no bears there—only bushes. Her field kit became entangled in the branches and was torn from her grasp as she cannoned off a springy sapling. She caught her foot under a root and toppled back into the peaty bowl. As she stopped rolling, the circle of bears closed around her again. An overwhelming terror trapped her limbs like leaden weights. Screaming with a force sufficient to burst her lungs, she could only look up into the small circles of reflected alien starlight. Finally even her screams were inhibited to a whisper. Hysterical fear gripped her and, hypnotized by the bright and bulbous eyes of the circling beasts, she hugged herself against the dirt, whimpered and gave up all hope of survival.

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SHE had no idea of how long she remained like this. Gradually she became aware of a lessening of tension and dared to ask herself why she had not been attacked and killed. A noise up on the side of the bowl made her shrink with a new fear—which changed immediately into a pathetic cry of relief.

"Peter! Peter—I'm here!"

"Seemly?" Peter Kohl's voice was surprised and anxious. A powerful handlamp played down upon her. "What the hell are you doing out here?"

The question was rhetorical. He did not even wait for an answer. The handlamp played around the edges of the bowl and probed the surrounding foliage. All the bears had gone. After scouting the area for a few minutes, Peter Kohl came back.

"Are you hurt?"

"Not much. Only what I did to myself. The bears—"

"On Loric it's always the bears," he said comprehendingly. "Did they attack you?" She heard the whip of leather as he drew his weapon from its holster.

"No—I—" She was weak and distraught and propped herself on her elbow with difficulty. "They just all came around and looked at me with those eyes. I tried to beat them off with my case, but I lost it. And then I got frightened—it wasn't just ordinary fright. I couldn't even move—"

"I know, I know," he said, as though her explanation were sufficient. He returned his weapon to his belt. "They've gone now anyway. Let's see about getting you back."

Seemly rose unsteadily to her feet and began to brush the clinging peat from her coverall. She was still trembling in uncontrollable spasms and instinctively sought the support of Kohl's arm. The look of seriousness on his face spoke volumes, but for the moment his attitude was purely one of concern. When she stumbled on a root he rumbled like a giant, swung her over his shoulder and carried her along the path without appearing to notice her weight at all.

When they came to the rockfall above the crystal bridge he set her down gently.

"I'll go down first—you follow. Don't be surprised if you feel me guide your foot to a hold. Whatever you do, don't panic. I'll break your fall if you slip."

Once started on the downward climb, Seemly was dismayed to find how difficult it was. The hazards of the descent contrasted so greatly with her memory of the outward journey that at first she considered Kohl had chosen a more dangerous route. It was only when they reached the head of the crystal bridge and she looked up that she realized that her recollection had played tricks on her. It was now obvious that for an inexperienced person to have climbed the broken face in darkness was tantamount to a suicide attempt. Kohl saw the expression on her face as she looked back up the treacher-

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ous barrier, but if he had any comment he kept it to himself.

This left the problem of crossing the crystal bridge itself. As before, the glassy straightness of the spar was plain under the dim light, but now the blackness of the canyon was a compelling magnet that threatened to draw her off the featureless surface and destroy her in the depths below. She took two steps before her courage deserted her. Turning back, she sat shaking on a crystal outcrop.

"It's no good, Peter. I can't do it. I haven't got the nerve."

"You crossed it earlier—and alone," he said reasonably.

"Earlier I was—" she searched urgently for the word she needed—"possessed? Does that make sense?"

Kohl nodded. "It does to me. But I can't leave you here and you won't find the crossing easier in daylight. So there's only one thing for it."

He bent down, swung her across his shoulder again and immediately started across the crystal bridge. Seemly shut her eyes, gripped the folds of his jacket and prayed that sudden panic would not cause her to kick and disturb his balance. After what seemed a lifetime a change in the sound of his footsteps told her that they were safely on the farther bank. Once more he set her down, but this time his face was stern and a little angry. He strode ahead down the bear tracks without a further word. She followed meekly, not daring to let him get too far ahead.

When they reached the ship, Robin Andersen was standing in the lock, searching the night with curious eyes. He gave a little gasp when Kohl came into view, followed by Seemly, pale and distraught.

"Doctor Kohl—what happened? Is she all right?"

"I found her in a bear covert on the other side of the glass canyon. Give her a sedative and make her get straight to bed. She should sleep off the worst of the effects. In the future, Captain Andersen, I'll thank you to maintain an electronic lockwatch at night. It serves a double purpose on Loric—not only does it warn you if something's approaching, it also cautions you when somebody's going out. I take it you didn't know Professor Vivian had left?"

"No. I assumed she was asleep in her cabin."

"I'll require you to give me a full report on this affair tomorrow. I don't expect to have to wet-nurse a supposedly competent survey team."

Andersen was about to contest the point, then saw the look of gravity on Kohl's face. Instead he threw a brief salute. If Kohl insisted on a lockwatch, he presumably had his reasons.

After all, it was his kingdom.

III

ANDERSEN called the team together in the operations room late the next morning. Seemly, although tired and depressed, appeared to have suffered no lasting ill effects

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from her experience. Realizing this was to be an official inquiry into her actions, she had dressed in her best uniform and now sat nervously on the edge of her seat and looked remarkably unhappy.

"The Resident wants to see me in an hour's time," said Andersen. "As you know, he found Seemly on the far side of the crystal bridge during the night, scared half out of her wits. Knowing her as I do, I've no doubt she had a good reason for going out there alone. But it wasn't very wise and it wasn't according to standing orders. Technically we're out on a limb, and the Resident could order us off-planet because of it. Therefore I have to hold a formal inquiry and produce a few good answers."

"I'd prefer to discuss my part first with you in private," Seemly said.

"Normally I'd be only too happy to oblige. But going out there at night was so far out of character for you that there must have been a pretty powerful factor at work. Something as powerful, perhaps, as the influence that took Kohl's wife over the edge of the crystal canyon. If there are any of these factors around, the sooner we all know and can recognize them, the safer we'll all be. Come on, Seemly—give."

Seemly's brow furrowed as she concentrated on her answer. "It's all very much like a bad dream. The truth is, I don't really know why I went out. I remember waking up and feeling certain I had something important to do. Thinking about it now I'm sure the feeling of important came first and I went around looking for something to attach it to. I think I started with Chad's cameras in mind, down by the crystal bridge. I know I was feeling quite interested and purposeful when I left the ship."

"And you weren't frightened then?" asked Andersen carefully.

"Not at all. Fear never occurred to me. The sky was so light I didn't even bother with a handlamp. You see, I knew where I was going, and it seemed such a perfectly ordinary thing to do. I even walked the forest path in darkness as though I'd been doing it for years."

"But Chad's cameras were all on this side of the canyon. You helped put them there yesterday. So what persuaded you to go across the bridge?'

"When I reached the bridge, I knew the important thing I had to do lay well on the other side. I crossed the bridge and even entered the second forest quite happily. It wasn't until I fell into a group of them that I woke up and began to get scared."

"Them?'

"Bears. I fell among them in a sort of bowl. Suddenly they were all around me. Whichever way I looked I could see nothing but eyes. I thought they were going to attack, but they didn't. I wonder now if they weren't as frightened of me as I was of them. But at least they didn't panic."

"Did you?"

"Not at first, but then I really flipped. I attacked them with my

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field case and tried to run. I ran straight into a bush, tripped and rolled right back among them. They all crowded around and just looked at me. I remember nothing but eyes on all sides—eyes full of strange stars. And I was more terrified of them than I've ever felt in my whole life. I suppose I was screaming, because my throat's still raw. But it wasn't just ordinary fear. It was the sort of fear which breaks you out of a nightmare—the absolute fear which comes from somewhere deep inside you."

"What happened then?"

"That's it—finish. King Kohl came by and brought me home. He had to carry me across the crystal bridge because I didn't have the nerve to make it on my own."

Chad Hartzman, who had been taking notes, looked up.

"A couple of things don't make sense to me, Seemly. First, I take Robin's point that it's utterly out of character for you to go out at night on your own. Weren't you even slightly aware that this was an irrational act?"

"No. I was certain that I had something to do. That's not an unusual experience for anyone. I didn't bother to tell anyone, because it didn't seem necessary. It's the sort of decision one makes every hour of the day without even being conscious of it."

"So whatever influence took you out there was certainly insidious. Secondly, I've seen you in some pretty tough spots before. The one thing you don't do when the pressure's on, is to lie down and scream. Something got into you, Seemly, and it's important we find out what."

"I wish I could tell you. All I know is that the fear was so intense that I was virtually paralyzed. Even if they'd attacked me, I don't think I could've raised a finger in defense."

"Which again is untypical of you." Chad looked at Andersen. "What do you think, Robin? Hypnosis? A drug of some sort?"

"I don't think it's that simple." Andersen had risen to his feet and turned to one of the viewports. He was looking out at the fringes of the forest. "I was standing at the lock when the old king brought Seemly back. I've just been asking myself why I was standing there when I should have been asleep."

"And did you get an answer?"

"Yes." Andersen turned back to face them. "The answer's that I was trying to remember what was the interesting and important thing I had to do near the glass canyon."

"Telepathy?" asked Chad, astounded.

"I honestly don't know. I can't explain it any more than can Seemly. But in case you've missed the point—what was it that took the old king to such an unlikely spot in the middle of the night?"

AN HOUR later Andersen returned. He looked dazed.

"Did he accept your report?" asked Chad.

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"Accept it? He congratulated us on it. The old devil was delighted that we'd picked up the point that Seemly couldn't distinguish her reasons for going out from any normal everyday decision. And he confirmed that the same influence prompted him to go out there. The difference was that he went deliberately to find out what was going on, taking a handlamp, a gun and enough ammunition to decimate the forest if necessary. He also alerted his garrison commander and told him where he was going—and why."

"I guess we still have a lot to learn," said Chad ruefully. "Did he explain how it was that the same thought occurred to the three of you?"

"No, but he knows. He just wants us to work it out for ourselves. He did add some information, though. The bears Seemly fell among were all females. Had they been males, she'd have been eaten alive. Also he showed me the off-going cargo lists for the two spacecraft that crashed after takeoff. Notably—both contained a pair of infant bears, destined for the Galactic Zoological Center."

"So what's the answer?" asked Seemly at last.

Andersen rubbed his brow. "Telepathy's still the only hypothesis that fits all the facts. I think that what you, Kohl and to a lesser extent myself, experienced last night was some sort of empathy with the bears. Some instinct prompted the creatures to congregate on the far side of the crystal bridge. I don't know what the call could mean to them in terms of their own social organization, but it's clear they all heard it. And we heard it, too."

"Would that also explain the quality of the fear I felt?" asked Seemly.

"I think so. A simple feedback mechanism. You blundered into their party and scared the hell out of them. They broadcast their fear back to you."

"Which is all very tidy," said Chad, "provided you accept that telepathy—especially telepathy between different species—is even a remote possibility. I'm afraid I don't accept it."

"Accept it or not, I don't have a better answer right now. Something called those animals together. It could have been some instinctive homing urge, but it was highly specific as to time and place. Then Seemly wakes up with a bug in her mind and makes for the same spot. Shortly the old king goes there, too. Some time later, knowing nothing of all this, I wake up with the same idea. There has to be some mechanism to explain all that."

"Granted—but telepathy—" said Chad doubtfully. "I admit you've stacked up a remarkable set of coincidences, but coincidences are all they need to be. I don't know what made Seemly go out there, but for all I know, the old king walks there every night. As for you, Robin—we heard nothing about your call until the rest of the facts had been estab-

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lished. That leaves fair scope for suggestion to supplement whatever was missing from the scene."

"Let's leave it there for now," said Andersen. "We don't have enough evidence to work on. There's just one point that strikes me, though. Your resistance to the idea of telepathy tends to confirm the hypothesis. This could be exactly the reaction that has made the old king's answers unacceptable to Survey Center."

SEEMLY thankfully exchanged her uniform again for a working coverall. She preferred the latter because it was more comfortable and because it had a plentiful supply of pockets, of which she was eternally short. Her unruly hair, which had been tightly drawn under her uniform cap, was released to find its usual position around her neck and over her forehead. This done, she felt again more like a woman and less like a symbol of the survey establishment.

Having pointedly announced her destination both to Andersen and Chad Hartzman, she went straight to the part of the naval ship that served as the Resident's office. Peter Kohl looked up from behind a pile of papers, this time appearing to be more of an academic and less of a barbarian. He was genuinely pleased to see her.

"Seemly! Grab a chair and sit down. None the worse for last night's experience, I hope."

"A bruised ego is about the worst," she said. "I feel I owe you an apology. I caused you a great deal of trouble."

"Not half as much as if I hadn't come along. I've a bad record for losing people. Perhaps you'll change my luck. Is there anything I can do for you—or is this purely a social visit?"

"I do have an ulterior motive. I'd like you to tell me something. Do you have any idea why so many bears were gathered in that one spot last night? Does it have any special significance for them?"

"If I told you the complete answer, you'd be as wise as I am. Which would spoil the object of your independent investigation. The circumspect answer is that I'm certain the location has no great significance. Such bowls occur all over the forests. I think the bears were holding a kind of party and its location was prearranged."

"Prearranged?" Seemly was doubtful. "You and I both responded to a 'call' to go there. That suggests spontaneity."

"It does no such thing," said Kohl seriously. A 'call' is a product of a gathering, not the cause of its inception. The function of a call may be to contact others who've missed the news, but there can't be a substantial call until a sufficient number are gathered."

"Are you sure of that?" asked Seemly.

"Completely sure. As soon as I receive a call, I always go out and

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check. That's why I went there last night."

"You realize the implications of what you're saying? If the meeting were prearranged the fact would suggest the bears have the ability to make abstract communications at a reasonably high level. Frankly, they would need a developed language."

"Which they have—after a fashion. Verbally it doesn't amount to much, but they're great writers."

"Writers?" The tone of her voice indicated she considered he was joking. Certainly his eyes were smiling, but with amusement because of her consternation rather than anything else.

"You don't believe they can write? I'll prove it to you. It isn't writing as we know it, but it's a written message just the same. Do you have this afternoon to spare?"

"To see bears writing I'd have a week to spare."

"Good. Join me after lunch. With a bit of luck we'll see an exercise in alien literature and possibly some literary appreciation."

"Wild—er—bears wouldn't keep me away from it. I still think you're pulling my leg."

"My dear Professor Vivian, you're a charming companion, but I don't underestimate your academic ability. If I promise to show you bears writing—that's exactly what you'll see."

THREE hours later, on a ledge overlooking the crystalline canyon, Seemly adjusted her binoculars to focus on the indicated point. A bear, one of the largest she had seen, came wandering along a path in the depths of the crevice. It cocked its head alertly as it rounded a bend in the track.

"He knows we're here," said Kohl. "But I don't think it'll worry him. They aren't at all shy. See what he does now."

The bear shook its head impatiently a few times, then rose to its hind legs before the slab of crystal Kohl had pointed out.

"Watch closely."

The bear began to jab and pat at the slab with its paws, following no apparent order but gradually covering most of the crystal with a scratch or a tap or a firm pad pressure. Completing the exercise after some twenty minutes, it dropped back to all fours and inspected the rock for a few moments. Then it ambled off in the direction it had been going.

"What was all that in aid of?" asked Seemly.

"That was a bear, writing."

Seemly adjusted her binoculars more carefully. "But there's nothing written there," she objected. "He may have been doing no more than catching ants or sharpening his claws."

"Nevertheless he did write something, even though we can't see it," said Kohl softly. "Now we must be patient and wait for the next bear to come along."

They had a long time to wait.

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Nearly an hour passed before a potential reader padded along the path. Even then the creature passed the spot and appeared to turn back only as an afterthought. Then, incredibly, it sat in front of the slab and gazed, its head rocking as it strove to follow whatever was written on the face.

"I don't believe it!" Seemly said. "He's reading the damn thing as though it were a poster."

This creature's departure was hurried. It almost ran from the scene, following the direction taken by the first bear. After a few minutes the episode was repeated, this time with a group of three bears who sat in comical unison gravely nodding their heads in front of the blank crystal surface. The three also left in a hurry, following the direction taken by the preceding two. Two more arrived a little later to study the slab.

"Convinced?" Kohl asked.

Seemly nodded. "Yes. But I wouldn't have believed it if I hadn't seen it with my own eyes. What's the explanation?"

"The bears have scent glands in the pads of their feet. I assume they evolved as trail markers to indicate whether a particular route was being taken in flight, pursuit of food or merely as an idle stroll. Such signals would have a strong survival value, and therefore favor natural selection, as would the development of an extremely sensitive nose."

"Chemical trail and domain markers are pretty widespread in the animal kingdom throughout the galaxy," said Seemly in agreement

"The bears on Loric have taken the idea a step further. They've settled on the flat faces of the crystal rocks when they really want to leave a message for the world. Using chromatography, I've managed to identify three individual scent products, all of them remarkably persistent. These are combined together on the crystal faces in an amazing spectrum of complexity. In their scent-writing they have the capacity—though I'm not sure how much of it they utilize—to compress more bits of information in a given space than we humans can in our optical writing."

"Then the bears don't read it—they smell it?"

"Precisely! But that's a technicality. Sensory information, however derived, is still information. If you smell smoke, you don't wait for somebody to shout 'fire.' The fact that we humans habitually exchange the bulk of our communications optically and verbally doesn't preclude other species' doing it differently."

"No argument about that," Seemly said. "But I've a feeling you've not yet come to the point you wished to make."

"Then I'll come to it now. I know of thirty-three of these reading sites in this one forest alone and there could be more. The other day we were discussing the responsibilities of a Resident. In all honesty, can you expect me to recommend colonization of a planet where the indigenous

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population publishes its own newspapers?"

Seemly was silent for a long moment.

"Could I examine the writing more closely?" she asked at last.

"Certainly. But I don't think it's worth the bother of climbing down into the canyon. There's a nearer one through the forest. Come, I'll show you."

A SINGLE bear-track led through the undergrowth at this point and she chose to follow the old king rather than take the lead. Patterned sunshine fell through the tracery of the overhanging branches and the forest air was sweet and warm and loud with the rasp of insects. Perhaps because of her recent conversation, she became aware of the multitude of individual scents of flower and fern which lingered in the soft air.

"Did you ever think," asked Kohl over his shoulder, "that even man has a remarkable memory for scents? Fragrances attach themselves to whole bundles of experience. A remarkably small trace of just the right odor can trigger a whole chain of recollections. You walk into a room—and suddenly you're transported years back to a scene where the essential essences were exactly the same. I sometimes wonder if a lot of our brain's spare capacity wasn't evolutionarily involved in scent memory—for some reason we've allowed the sense to atrophy. It isn't considered civilized to go around sniffing at your neighbors. I'm sure the human race is the poorer for it."

"I know what you mean about the memories—I remember childhood Christmases by their smell. Puddings and spice and citrus, liqueurs and incense—all somehow synonymous with a child's excitement. I also remember the smells of examination halls and places I've hated."

"A good observation. Unusual levels of stress, excitement or fear seem to heighten scene perception. At such moments we're thrown back closer to the instincts of our animal ancestors, for whom good scent perception could mean the difference between life and death. It's curious how much remains to be discovered about ourselves."

They emerged into a forest clearing at a point where many bear paths crossed. At one corner of the intersection a huge prism of crystal protruded from the ground. From what Kohl had already told her, Seemly knew that the placing of the intersection was no accident. The smooth, glasslike face of the prism had an important function—this was confirmed by the fact that all the tracks merged deliberately to pass one particular face.

Seemly studied this face carefully. She had no way of knowing what sort of message might be im printed on it. Was it, as Kohl had suggested, a form of newspaper? Or was it an elementary signpost? Perhaps it was a list of local residents—or an indication of the best areas for

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hunting. Perhaps even a record of visiting pilgrims. She stood before it, entranced and intrigued.

The old king was watching her from a short distance, quite amused by her intense concentration.

"I know what you're thinking, Seemly. Will we one day discover a Rosetta stone that will unlock the mystery?"

"Well—what do you think?"

"I'm sure the key exists—somewhere inside us. Sometimes when I'm looking at one of the crystals I get the strangest impressions—images of places I've never seen and recollections of conversations I'm sure I've never had. I can't tell if it's imagination or whether I'm being influenced by the imprint on the crystal face. My guess is that the scents trigger chains of unusual associations. They'd have the greatest meaning for those for whom the message has the greatest relevance. What you might read there could be different for everyone."

"WHAT about adaptive colonization?" Seemly asked. They started back along the edge of the forest toward the plateau where the ships stood separately on their pads. "Wouldn't it work if it were made incumbent on the colonists to adapt to the special requirements of the bears—rather than try to force Loric into a Terran mold?"

"No. It could be disastrous either for the colonists or for the bears. Short-term, I suspect the bears would win. So far you've only seen the tip of the iceberg. The only way a Terran colony could survive on Loric would be by virtually eliminating the bears—and that, I hope and pray, is contrary to the Space Conventions."

"The bears will be safe under any circumstances," Seemly declared. "You've made your point and my reports to Survey Center will support you. But the bears' reading potential is only one factor to be considered. They could be evolutionary dropouts. Terra couldn't hold up colonization for a species in evolutionary decline."

"It would take a thousand years of observation even to discover which way they were going, though my favorite bet is up. Their paws include an opposed thumb, which gives them the ability to use tools when they need to. They've a high order of intelligence and they're able to record and communicate complex ideas—which in itself means they must have developed powers of abstract visualization. In short, they've the potential to develop everything we mean by civilization, though it's difficult to see what advantage they might gain by so doing. There's no virtue in civilization unless it carries an enhanced survival value. Space travel and Coca Cola aren't in themselves relevant criteria."

"I grant you that, but you still haven't given me a good reason why you think human coexistence on Loric is impossible."

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"I have my reasons, Seemly. But they'll have more force if you deduce them for yourself. I'll give you one last clue—the bears and the humans are too damn much alike."

They were halfway across the plateau before Seemly found her tongue again.

"Too much alike?" The phrase plainly worried her.

"Certainly. There's an interaction between the bears and the humans which neither can avoid. Captain Andersen has diagnosed the effect as telepathy. He's absolutely wrong, but the strength of the effect is something to which you can personally testify. All in all, you were lucky."

"I'm sorry," said Seemly.

"Sorry?"

"Your wife wandered off in the same way, didn't she? That was why she died."

"It was. In those days we still underestimated the potency of the effect. Even when the second contact team left we still hadn't realized exactly what we were up against. I was still blundering around looking for something like telepathy to explain the facts. It was only later I found the real answer."

"Then you know what caused the field-contact teams to crash?"

"I've only been able to give a name to it these last few months. Both of the teams wanted to take bears back to the Galactic Zoological Center for further study. That's permissible under license, of course, but we all overlooked a vital point.'

"Which was?"

"The interaction between bears and humans is compulsive even over a fairly long range. In the confines of a spacecraft the reaction of a pair of frightened bears produced a greater effect than the human crews could stand. The bears' panic literally took command."

Seemly's comprehension was swift. "The bears communicated their extreme fear to the crew, just as the bears in the bowl affected me?"

"And probably the converse was also true. Try to imagine communicating to a bear the stresses of a space crew during liftoff. It's anxieties would reinforce the natural apprehensions of the bear. In a small, closed system you arrive at total feedback with no damping mechanism. The intensity of fear spirals upward—and the inevitable result is a ship out of control."

"And you're now able to give a name to the source of this interaction? And it isn't telepathy?'

"No, it isn't telepathy. And the rest of the answer you must determine for yourself.'

IV

SEEMLY'S sleep was shattered by alarm bells screaming in her mind: *Danger! Emergency!*

She was dressed and through the cabin door before she was fully awake. In the corridor she collided with Hartzman.

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"What's the matter, Chad? What's going on?"

"I don't know—but that damn siren woke me—"

"What siren?"

"The emergency—"

"You're dreaming, Chad. Survey ships don't have emergency sirens. We'd better get Robin."

"He just passed me, headed for the fire bay."

"Let's hope he doesn't make it."

"Why?"

"Survey ships don't have fire bays. Our fire control's all manual, remember?"

"But the emergency—'

"I don't know what it is or where it is, but I know sure as hell there is one. You'd better get to the controls in case we need emergency liftoff. I'll go look for Robin."

She went down into the hold. At the foot of the ladder she found Andersen heaving boxes into a corner.

"You've picked a rare time for taking inventory," she said critically.

"No joke, Seemly! Some criminal idiot's loaded stores across the fire-bay hatch."

"Knock it off, Robin. There's no fire bay on this ship. If you ever did get through that bulkhead you wouldn't find a thing but engines. You're dreaming of a spacer."

Appalled, he stopped and banged his head with his hand. "D'you know, you're right! God—what a mistake to make in an emergency! I could lose my ticket for this."

"Chad's gone up to the controls. I think we'd better get there first in case he tries an emergency liftoff. I doubt we'd survive it down here."

"He wouldn't be so stupid—"

"Robin, until I've had the chance to knock your silly heads together I wouldn't certify either of you as rational!"

Pausing only to assure herself that Andersen was following, she climbed back up the ladder. The captain overtook her in the corridor, grabbed her arm.

"Seemly—what's the emergency?"

"I don't know, but the sense is strong, and it's getting stronger. I've a feeling of panic, a desire to run—but I don't have a thing to attach it to."

"Telepathy," said Andersen suddenly. "It's those bears again. Something's happening to them, and it's their fear we're feeling. Something to do with fire. That's it! There has to be a fire."

Seconds later they entered the control room. Chad was methodically going through the takeoff preparations. Through the viewports at least part of the answers became apparent. Against the vivid darkness of the Loric night, a great tide of flame was visible, stretched broadly across the horizon. A vast fire was eating its way through the forest adjacent to the spaceport.

Andersen began estimating the danger to the ship. He stopped Chad's countdown well clear of liftoff.

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"Hold her ready, but I don't think it'll be necessary to go. The plateau should give us sufficient clearance even if the nearer trees do catch fire. We'd better stay on internal atmosphere because of the smoke. Seemly, call the old king on the radio and check that they're okay."

"Right." She turned her attention to the communications board and waited impatiently for Kohl to reply. Shortly his voice came through.

"Thanks for inquiring, Seemly, but we're well protected by natural fire-breaks here. How are the tensions affecting you?"

"The tensions?"

"The fire panic--don't tell me you don't feel it?'

"We felt it all right. Caused quite a bit of consternation at first. Then we realized we were reading the bears' danger, not our own. The feeling's going now.'

"That's curious. The bears' general pattern of flight has been in your direction. You should have the greatest concentration of them--hence, feel the greatest tension."

"That's something to know. We'll call you back if the situation changes."

"Answer me one question before you switch over, Seemly. Your ship's prepared for liftoff, isn't it?"

"All the standard preparations. Why did you ask?"

"Curiosity, that's all."

"It's more than that. You don't ask questions without a good reason."

"Seemly, would you like to try a little experiment?"

"At this time of night?"

"It's an opportunity that's not often repeated."

"I'll check with Robin."

"Don't! It may not work too well if he knows what to expect. Let's keep this to ourselves. Here's what I suggest you do--"

"I DON'T like the look of it," Andersen said after a while. "The fire's coming too close for safety."

"But we're well clear of the trees," said Seemly.

"We aren't well clear of the brush and grasses. If they catch it'll come right through the area."

"What if it does? All that could reach the ship would be a few sparks and a little heat. That's nothing compared with atmospheric insertion conditions. And after all, we are on a landing pad."

"With the quantity of fuel we carry even sparks and a little heat don't add up to a sensible risk. What do you say, Chad?"

"I say let's get out of here. Heat exposure under atmospheric conditions is a different animal from heat of insertion under near vacuum. That fire could fry us if the tanks go up."

"Sorry, Seemly. You're outvoted two to one--even assuming that as captain I weren't solely responsible for the ship. Resume countdown, Chad."

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"Stop being stupid," said Seemly fiercely. "Our fuel reserves only give us one liftoff package. Expend that now and we'll have to return to Survey Center for refueling before we can come back. That'll take a month at least. Think about it. Is our position really that serious?"

"In my opinion, it is," said Andersen. "What's got into you, Seemly? You don't usually question my flight orders."

"I'm trying to make you under stand that you're being irrational. It's the bears' fear that's controlling your decision. The actual risks are negligible."

Chad swung to the captain's defense. His hand made a gesture to encompass the sea of fire before them. "You call that negligible?"

"Not if you're an exposed bear. But if you're a man in a heat-insulated space vehicle—of course it's negligible. Look at the hull thermistor readings. Less than the temperature the sun's shining."

"They could be misreading," Chad said dubiously.

"All of them? Stop the nonsense. You're making the same kind of mistake I made when I went across the crystal bridge. You think you know what you're doing and you think you know why, but it's the bears' panic you're feeling."

Andersen shook his head. "If that were true it would also be affecting you. You wouldn't be able to see it either."

"It is affecting me. But I knew it was coming. In fact, I caused it to come. King Kohl told me what to do."

"Then for Pete's sake stop it! Let's get down to some rational thinking. What did you do to cause it?"

"I merely switched the ship back to circulating the external atmosphere. If the effect is telepathy it's remarkably attenuated by the closing of a ventilation port."

TEN minutes later, with the ship again on its own internal atmosphere, they sat and watched the brush and short grass burn off around the perimeter of the landing pad. It was an interesting sight but contained no element of hazard whatsoever.

"Well, you've proven your point," said Andersen. "Now explain it to us."

"I can't explain it—yet. But Kohl put me up to it. He knew it would work—and to my mind that's significent. When I mentioned to him earlier that the tensions in the ship had lessened he guessed that we were prepared for liftoff.'

Andersen was thoughtful. "So to him the effect is both deducible and reproducible. Which suggests he knows exactly what he's talking about. Apart from the effect's being airborne I don't know what it is he's got, but we could waste a lot of time before we came up with an answer we could use with the same degree of certainty. I vote we capitulate and

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ask the old king to let us see his reports."

"I don't see how we can, Robin. He's bending over backward not to influence us," said Chad.

"For which I'd thank him if I thought we might seriously disagree with his answers. But he's on solid ground and he knows it. So what's the point in our sitting around 'discovering' what he's already documented? We're supposed to be professionals, not first-year students."

"What brought this on so suddenly?" asked Chad. "You've had a great change of heart since yesterday."

"Yesterday I couldn't see a reason for refusing colonization. Today I can. Picture a colony exposed to what we've just been through. We've overreacted to stimuli, consistently made the wrong decisions and generally made fools of ourselves. In our case, it wasn't too important. We'd have survived even if we had placed ourselves into orbit unnecessarily. But in a colony such misconceptions could be disastrous. So I take it that's one of the old king's answers we're ready to endorse."

"I'll go along with that," said Seemly. "You can't run a colony if you can't trust the basis of your own decisions. The insidiousness of the effect is as dangerous as its intensity."

"So how do you propose to tackle him?" asked Chad.

"If you don't mind," said Seemly, "I'd prefer you left it to me. I think I'm just beginning to see the light."

SHE found Peter Kohl behind the usual clutter of papers when she went into his office. He looked curiously at the letter she handed him.

"What's this?"

"A copy of our radio communication to Survey Center. It confirms that in our opinion Loric is unsuitable for colonization. Reading between the lines, the commissioner owes you an apology."

"I've never doubted it, but thanks for your support. I take it you've worked out the answer."

"Only the principle. It's all to do with pheromones, isn't it?"

"You're absolutely right! Pheromones—exo-hormones. Airborne chemical messengers every bit as powerful as the hormones that control our bodies. But these originate from other organisms, namely the bears. They're effective in negligible concentrations and over distances of several kilometers if the air currents are favorable."

"That's what had me baffled," Seemly said. "I know of pheromones as sex attractants and colony regulators in the insect world, but it's difficult to accept their role in higher mammals."

"Only because you've not thought about it before. The canine bitch in season broadcasts just that effect. And although we try to deny it, there's ample evidence that human crowd psychology is similarly controlled. Mob panic, excitement and hysteria are more satisfactorily ex-

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plained in terms of pheromone concentration than by any psychological mechanism."

"I'd never realized that."

"It's a sad reflection on our age that we spend too much time looking at the rest of the universe and too little looking at ourselves. I suspect exo-hormones had a strong survival value for the human race in our early stages of evolution. Unification of mental states is a vital part of the herd instinct. Somehow we've tried to forget this basic aspect of nature, but reality dies hard. Even the language still carries phrases like the scent of danger and the smell of fear—unwitting acknowledgment of our more chemically sensitive past."

"Assuming I accept all that as true," said Seemly, "it still doesn't explain about the bears. Surely the hormone would be specific to the species?"

"A reasonable assumption—and one that has a great deal going for it. It's the basis behind my refusal to sign the colonization acceptance. The truth is that the bears aren't bears at all. Except for size and bodyweight, they've more in common with elementary Terran primates. Environmental differences modify the courses of natural selection, leading to an infinite variety of potential evolutionary chains—but the point at issue is this: the biochemical similarities are such that I can only consider Loric bears and *Homo sapiens* to be descended from the same evolutionary stock."

"You have to be joking!"

"Do I?" The old king was serious. "Everything from gastric enzymes to rhinal morphology points to the bears' being analogues of the early ancestors of man. Any interference with their evolution could have an incalculable effect on the future of the organic population of the universe. Think about that, Seemly. View it against the intentions of the Space Conventions. And if you've any doubts, remember their hormonal and pheromonal makeup is exactly interchangeable with your own. Coincidence? I doubt it."

"But the activity of the pheromones over long distances is fantastic—"

"I suspect the human receptors aren't much dimmed. It's the excretory mechanisms which have atrophied in man. The sweat accompanying fear or tension is about the most obvious signal we can still produce."

"Surely we'd be aware of being affected if even a vestigial link between humans remained."

"Not necessarily. Various things—certain psychotropic drugs, for instance—can affect mental attitudes without being called into awareness. And just how aware are you of the effects of your own hormonal body chemistry? It colors your every thought, yet you rationalize the feeling to produce a 'reason' for your attitude's being what it is. We're all liars to ourselves, Seemly. Trying to rationalize what our molecules are urging us to do . . ."

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"WELL, I guess that ties it up," said Andersen, as he signed the final copy of the report. "It's ironic that we had to travel to the end of the universe to find out we may be strangers to ourselves. I suppose you'll use this as the starting point for a new university research project—filling in the gaps in the old ideas on crowd psychology and herd instinct?"

"I'll certainly do some research on it," said Seemly. "But I'm not returning to the university—not yet."

"A lecture tour, perhaps?"

"No. I've contacted Space Survey for permission to remain here. My field experience qualifies me for a junior Residency."

"Stay on Loric with old king Kohl?" Andersen was surprised.

"There's a lot of work to be done on Loric, Peter's only scratched the surface of it. For the first time we've a chance to study the human prototype at an early stage in evolution. Those bears are laying down the deep-mind patterns that can give us a whole new view of human psychology. The implications for civilization are immense."

"And?"

"And what?"

"Come off it, Seemly! We've been together too many trips. I know you when you've a big idea in mind. Don't tell me you're thinking of making a play for the old king?"

"Could you blame me? He's probably the best planetary ecologist alive and he's one of the kindest and most understanding men I've ever met. And he isn't even very old."

"Well, I hope you've thought about it carefully. It could be the old king won't play. A wasted Residency here could make a big hole in your academic life."

"I have thought about it, Robin. Really I have. The way I see it, Loric in the bears' mating season is going to be a very interesting place." ★

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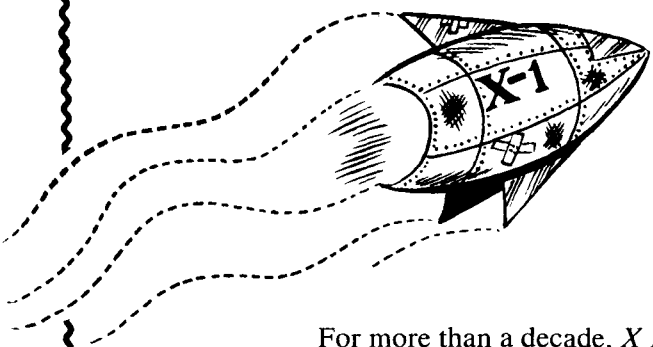

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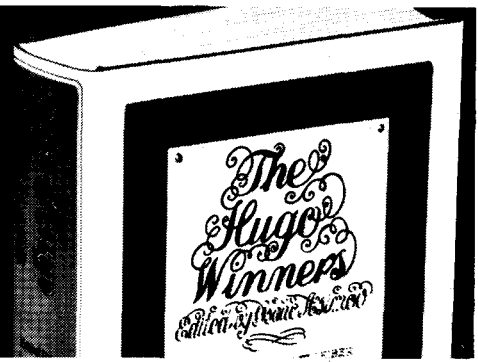

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